UNIV OF
TORONTO
LIBRARY

P
Med
A

THE

AMERICAN JOURNAL

OF THE

MEDICAL SCIENCES.

EDITED BY

ALFRED STENGEL, M.D.

WITH THE CO-OPERATION IN LONDON OF

HECTOR MACKENZIE, M.A., M.D., F.R.C.P.

NEW SERIES.

VOL. CXIX.

248962
20/11/30

QUAE PROSUNT OMNIBUS

PHILADELPHIA AND NEW YORK:
LEA BROTHERS & CO.
1900.

R
11
A5
n.S.
v.119
cop.2

Entered according to the Act of Congress, in the year 1900, by
LEA BROTHERS & CO.,
In the Office of the Librarian of Congress. All rights reserved.

DORNAN, PRINTER,
PHILADELPHIA.

CONTENTS.

ORIGINAL COMMUNICATIONS.

PAGE
Report of Five Cases of Endocarditis Occurring in the Course of Tonsillitis. By FREDERICK A. PACKARD, M.D. 1
Tracheal Diastolic Shock in the Diagnosis of Aortic Aneurism. With a Study of the Value of the Tracheal Tug. By J. N. HALL, M.D. 10
Report of a Family Outbreak of Trichinosis. By GEORGE BLUMER, M.D., and LEO HAENDEL NEUMAN, M.D. 14
The Relation of Migraine to Epilepsy. With the Report of Illustrative Cases. By WILLIAM G. SPILLER, M.D. 24
Facial Spasm and its Relation to Errors of Refraction. By E. W. STEVENS, M.D. 33
Cystinuria and its Relation to Diaminuria. By CHARLES E. SIMON, M.D. . . 39
On Splenic Anæmia. By WILLIAM OSLER, M.D. 54
A Critical Summary of Recent Literature on Gonorrhœa in Women. By JOHN G. CLARK, M.D. 73

REVIEWS.

General Physiology: An Outline of the Science of Life. By Max Verhorn, M.D. 82
Treatise on Human Physiology. By Henry C. Chapman, M.D. 84
A Manual of Venereal Diseases. By James R. Hayden, M.D. 86
The Mineral Waters of the United States and their Therapeutic Uses. By James K. Crook, A.M., M.D. 87
Text-book of Ophthalmology. By Ernest Fuchs, M.D. 88

PROGRESS OF MEDICAL SCIENCE.

MEDICINE.

PAGE
Origin of Gall-bladder Infections and Formation of Gallstones . . 89
Angina and Rheumatism . . . 90
Hour-glass Stomach 91
Traumatic Paralysis Agitans . . 92
Endocarditis 93

SURGERY.

Retraction of the Plantar Aponeurosis 94
Resection of the Cervical Portion of the Œsophagus for Carcinoma . 94
On the Surgical Treatment of Hemorrhage from Gastric Ulcers . . 95
Gastroplication for Dilated Stomach . 95
So-called Sciatic Scoliosis . . . 96
Restoration of Entire Tibiæ Necrotic from Acute Osteomyelitis . . 96
Structure and Function of Kidney . 97

PEDIATRICS.

Kernig's Sign in Cerebro-spinal Fever 99
Parkinson's Syndrome in Childhood 100
Tuberculosis in Childhood . . 100
Gastro-intestinal and Scrotal Hemorrhages in an Infant One Month Old 101

THERAPEUTICS.

PAGE
Treatment of Gastric Hemorrhage . 101
Guaiacol- and Creosote-carbonates . 102
Cantharides as a Hæmostatic in Hæmaturia 103
Treatment of Forty-three Cases of Typhoid Fever 103
Disinfectant Action of the Cresols . 103
Formalin Injections for Inoperable Epithelioma of Larynx and Neck . 104
Treatment of Gonorrhœa 105
Sanarelli's Anti-amarylic Serum . 105
Tetanus Treated with Antitoxin . 105

GYNECOLOGY.

Changes in the Ovaries during Pregnancy 106
Climacteric Neuroses 106
Formation of Tubo-ovarian Cysts . 106
Calcareous Deposits in the Ovary . 107
Palliative Treatment of Inoperable Carcinoma 107
Direct Ligation of Vessels in Cœliotomy 107
Conservative Treatment of Chronic Inversion 108
Intravaginal Fixation of Prolapsed Uterus 108
Influence of Castration on the System 108
Senile Endometritis 109

OBSTETRICS.

Post-partum Hemorrhage . . . 109
Acute Infection of Umbilical Origin . 110
Ectopic Gestation Complicated by Tuberculosis and by Gonorrhœa . . 110
Adhesion of Placenta to Fœtal Head 111
Cæsarean Section and Symphysiotomy 111
Spontaneous Inversion of the Uterus 111
Cæsarean Section in Septic Cases . 112
Bacteria Found in Puerperal Uterus 112
Hydramnion in Cases of Homologous Twins 113

OTOLOGY.

Prophylaxis of Acute Otitis Media . 114
Paracentesis of the Membrana . . 114
Middle Ear in Tuberculosis . . 115
Mastoid Operations in Chronic Purulent Otitis Media 116
Agorophobia Caused by Aural Lesions 116

OPHTHALMOLOGY.

Theory of Accommodation . . 117
Influence of Accommodation on Intraocular Pressure 117
Holocain for Corneal Ulcers . . 118
Accommodation in the Lower Animals 118
Treatment of Scleritis and Episcleritis 118
Reclination of the Lens . . . 119

DERMATOLOGY.

Resorcin-alcohol in the Treatment of Seborrhœic Eczema of the Face . 119
Case of Acute Disseminated Miliary Tuberculosis of the Skin . . 119
Eleven Cases of Porokeratosis (Mibelli) in One Family 120
Rose-spots in Influenza . . . 120
New Agent for the Treatment of Alopecia Areata 120
Acne Urticata 120
Blastomycetic Dermatitis . . . 121

HYGIENE AND PUBLIC HEALTH.

The Possibility of Tubercular Infection Through Milk, Butter, and Oleomargarine 121
Autumnal Diarrhœa in Cities . . 123
Formaldehyde Disinfection . . 123
Detection of Horsemeat in Sausages . 124

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

JANUARY, 1900.

REPORT OF FIVE CASES OF ENDOCARDITIS OCCURRING IN THE COURSE OF TONSILLITIS.[1]

By Frederick A. Packard, M.D.,
of Philadelphia.

One of the most interesting questions in medicine at the present time is the etiology of acute articular rheumatism. Each year there is a steadily growing assurance that it should be classed among the acute infections; and, while it cannot be said that as yet the causative agent has been found, our knowledge is in reality more definite in regard to this disease than it is in respect to scarlatina and many of the other well-recognized infections. It is as a slight contribution to our knowledge of what might be called collateral evidence of the infectious nature of acute articular rheumatism that the present report is made. The subject of the pathogenesis of acute articular rheumatism, and its allies among the "rheumatic group," was at first thought of by me as the text of a paper before the Association; but a discussion of the subject, as a whole, would have far exceeded the proper limits of such a paper, and I decided to make simply the subjoined report, reserving for another occasion the account of examples of other associations of this interesting "rheumatic group of diseases."

In offering this report, I must express my regret that in none of my cases was a bacteriological examination made to determine the causative agent of the angina.

Case I.—L. S., white, aged four years, had been under my care during 1893 for one or two slight acute and transient ailments. He had been several times thoroughly examined on these occasions without the discovery of any abnormality except the signs of his various slight illnesses. On Christmas day I was sent for to see him because of anorexia and fever that had come on acutely on the morning of that day. I saw him in the afternoon, and found that he had an axillary temperature of 102.6°, and that the right tonsil was slightly inflamed, and that there was an enlarged lymph-node at the angle of the right jaw. On the next day I noticed that there was slight "cardiac excitement," although the temperature had fallen to 99.2° and the throat looked much better. On December 27th I made the note that he had had a bad night. His temperature was, when I saw him, 101.2°, the pulse 108. The gland at the right angle of the jaw was rather larger, although the tonsil looked perfectly well. At the apex there was a whirring systolic murmur of short duration. Under the right clavicle there was a loud, whirring systolic murmur almost continuous, and sounding almost precisely like the venous hum of anæmia. The same hum was heard close to the sternum on the left side just below the clavicle. At the same time auscultation of the neck showed the presence of a loud, roaring continuous murmur over the enlarged gland. That night he suddenly awoke, complaining of pain in the region of the heart. When I saw him on the afternoon of the 28th his general expression was better, his temperature a degree lower, his pulse 110. His apex-beat was found to have travelled to the left, and to be 4 cm. to the left of the left nipple line, while the right border of cardiac dulness was at the left sternal border. At the apex the harsh systolic murmur was still present and well transmitted for a short distance to the left. The same humming murmurs were present at other situations as on the previous day.

---

[1] Read before the Association of American Physicians, May, 1899.

From this date the course was one of steady improvement. The temperature fell to normal by January 1st, and the general condition rapidly improved. With the subsidence of fever the humming murmurs below the clavicles and over the glandular swelling disappeared. The pulse continued to be irregular in force and rhythm and the heart readily excited, so that confinement to bed was continued for two weeks after the temperature fell to normal and until the heart's action ceased to be affected by change of posture. The apex-beat gradually but steadily returned to the normal position. The rough murmur persisted at the apex, and was heard to the left. This cardiac condition remained until he passed from under my immediate observation on going to the seashore.

I again examined him in December, 1894, because of the persistence of the glandular swelling and of an attack of acute bronchitis. Examination of the heart then, one year after his illness, showed the presence of a blowing systolic murmur at the apex, well transmitted to the left anterior axillary line, of accentuation of the second pulmonary sound, and the right border of cardiac dulness at the right edge of the sternum, the apex-beat being in the normal position.

The presence of such an apical murmur as that described would, of course, not prove the presence of endocarditis any more than would the presence of the venous murmur beneath the clavicles prove organic lesion, as these latter are of great frequency as transient phenomena in many acute illnesses of childhood, and are of little significance. The persistence of the apical murmur, its transmission to the left, the accentuation of the pulmonary second sound, and the extension of cardiac dulness to the right one year after the subsidence of the acute process, show that organic change was present at the mitral area, probably a mitral valvulitis.

Case II.—D. W., white, aged fourteen years, school-girl, had been several times under my care for slight ailments over a course of four or five years, and had never presented signs or symptoms of cardiac lesion. In 1894 she had a mild attack of angina with catarrhal inflammation of the pharynx. For several days thereafter the heart's action was quite irregular, but finally became steady. During and after this attack the heart-sounds were entirely free from murmur or other evidence of organic change. On October 11, 1895, I was asked to see her because of pain on swallowing, noted that morning. The apparent cause was chilling from sleeping under too few coverings. There had been no rigor and no sensation of fever. All the structures of the throat were found to be intensely red and dry. The pulse was 108, the temperature 100°. On auscultation of the chest there was found "over the body of the heart a somewhat musical systolic murmur with a rather 'whipping' character." Under treatment the angina promptly disappeared, but the murmur continued, and my notes describe its characters and localization as follows:

On October 12th it was still heard over the heart, and had a "swishing" character. On the 14th there was at the apex a loud, clear-cut systolic, rather blowing murmur, well transmitted to the left axillary region. On the 21st the murmur was still very loud and clearly transmitted to the left posterior axillary line. On November 7th palpitation and breathlessness were marked on making a slight but unusual exertion.

On November 9th the murmur was well heard at the lower angle of the left scapula. On November 29th the murmur is described in my notes as very loud, whirring in character, and well-heard, not only in the left axillary region, but also at the scapular angle. Shortness of breath was present on going up stairs, but not at other times. The latter symptom soon subsided, but the systolic apical murmur, with accentuated second pulmonary sound and slight extension of cardiac dulness to the right, are still present after the lapse of four years. Compensation is apparently perfect.

Whether, in this case, the attack of angina in 1894, a year before the appearance of physical signs of organic change, had been accompanied by slight cardiac damage cannot be determined. Possibly the peculiar and marked cardiac irregularity, noted then for the first time, may be an indication of some injury sustained at that time, to which fresh additions were made as a result of the second attack of sore-throat.

Case III.—Eugene A., white, aged six years, had been feeling badly for a week, with sore-throat and fever for four days, before I was asked to see him, on October 18, 1894. I had never examined him before, and consequently do not know certainly of his previous condition. He had never been ill, and had had no cardiac symptoms. I found that he had had a temperature of 101.2°, greatly enlarged and acutely inflamed tonsils, especially that on the left side, quite profuse sweating, but no swelling, pain, or tenderness of the joints. On examining the chest there was found the following condition: The apex-beat was in the normal position. Distinct pulsation could be seen and felt over the whole præcordial region. Cardiac dulness began at the third rib in the left parasternal line and at the mid-sternum at the level of the fourth interspace. No thrill could be felt. In the whole region of the apex-beat there was a harsh, rasping, systolic murmur transmitted best toward the left, but heard with diminishing intensity as far to the right as the root of the xiphoid. The throat rapidly improved and the general symptoms steadily subsided, but the heart condition remained the same. On October 24th, about a week after my first visit, I made the note that the apical systolic murmur persisted, but that within forty-eight hours there had developed between this and the preceding visit a harsh, low-pitched systolic murmur heard best at the aortic area and transmitted into the carotids, and also a distinct tó-and-fro friction sound, which was best heard just within the apex. After a few days the friction sound and the systolic aortic murmur disappeared, and there developed a presystolic murmur at the apex. The double murmur at the apex continued long after all other signs of illness had disappeared. I again examined him at the end of the month, and made the note that the apex-beat was at the junction of the fifth interspace and the left mid-clavicular line, that the cardiac dulness began at the upper border of the third rib in the left parasternal line and at the right border of the sternum, and that there was a crisp presystolic and blowing systolic murmur at the apex, with accentuation of the pulmonary second sound.

Occasional subsequent examinations during the next year showed persistence of these signs. While the condition of the heart before this illness is not certainly known, he had never shown any symptoms of cardiac trouble, and had had no previous rheumatism, scarlatina, or other of the diseases likely to produce endocarditis. The progressive addition of signs of recent endopericarditis tends to strengthen the probability that the whole process was of recent origin, and was an immediate result of the throat trouble.

Case IV.—Andrew S., white, aged thirty-two years, was admitted to the Philadelphia Hospital, under Dr. Musser's care, on December 11, 1894, and through the latter's kindness was frequently examined by me. He had never had rheumatism, and had at no time suffered from cardiac symptoms. A week before his admission he began to have malaise, loss of appetite, and headache. Five days before admission he had a slight chill, soon followed by pain and difficulty in swallowing. He had no articular pains. On examination the mucous membrane of the fauces and pharynx was found to be swollen and reddened, and the submaxillary lymph-nodes were plainly enlarged. The apex-beat was in the fifth interspace, a half-inch to the inner side of the left vertical nipple line. The area of cardiac dulness was normal. No thrill was present. At the apex there was a low-pitched, rumbling, plainly presystolic murmur, followed immediatly by a low-pitched systolic murmur well transmitted to the axillary region. In addition to these murmurs there was a high-pitched musical sound, occurring during the latter part of the systolic murmur, heard best just to the right of the apex, and not transmitted. The latter murmur was transient, but was heard at odd times on several occasions. Four days after admission, after the throat condition had greatly improved, there appeared quite severe pain on motion in the right arm, with tenderness over the nerve-trunks. On this day the notes state that the three abnormal sounds in the region of the apex were well heard, although on the day before the musical sound and late systolic murmur could not be detected. While the presystolic and systolic murmurs persisted until his discharge, on January 18th, the musical note was still as inconstant as before.

I saw this patient again in the latter part of July, 1896, a year and a half after his first coming under observation. He was then in Dr. Lewis' ward at the Pennsylvania Hospital, to which institution he had been admitted for malaria. Examination then showed that the apex-beat was diffuse, but with its greatest impulse in the fifth interspace 10 cm. from the mid-line. There was a faint suspicion of a presystolic thrill at the apex. The cardiac dulness began at the lower border of the third rib in the left parasternal line, and a trifle to the right of the right sternal border at the level of the fourth interspace. There were present a presystolic and a systolic murmur, the latter being well transmitted into the axilla, and heard at the left scapular angle. On a second examination, after a few days' rest in bed, the presystolic murmur could not be heard on one occasion.

While incapable of positive proof, the heart in this case was presumably healthy before his tonsillitis, and the latter either originated or aggravated an endocarditis.

Case V.—In November, 1895, I was asked to see E. R., white, aged five years, whose regular medical attendant was out of town. I found that he had been well all summer, but that a few days before I was called he had suffered from a slight sore-throat, of which there was a small epidemic through the household. My services were asked because of the appearance of a glandular swelling on the left side of the neck, that had been first noticed on the evening before. On examination I found an enlarged and tender lymph-node below and behind the left ear. There was no visible trouble in the throat, ear, or scalp. On listening to the chest I found a short, musical systolic murmur, with its point of greatest intensity at the apex, and well transmitted to the left anterior axillary line. There was no change in the area of cardiac dulness. I saw him once or twice within the next few days, but upon the return of his regular medical attendant transferred him to his care. The exact subsequent heart condition I do not know, but I heard from his mother that during the succeeding winter his physician had given such directions regarding exertion as pointed directly to the persistence of signs or symptoms of an impaired heart.

While I had never listened to this child's heart before the occasion of this visit, I could obtain by close questioning no history of past illness likely to cause, or of preceding symptoms pointing toward, any cardiac trouble.

The first question that arises in regard to these cases is the value of the evidence of the existence of endocarditis. I have gone a little at length into the subsequent history of some of them, in order to show that the physical signs were persistent, and that subsequent changes in the cardiac outlines and other signs were precisely those that would convince us of the presence of mitral valvulitis as a result of a frank attack of acute articular rheumatism had that been the acute illness from which the condition dated.

In all these cases careful inquiry into the past history failed to reveal any articular pains, and careful examination showed no present signs of joint trouble. They were manifestly, therefore, not to be classed as cases of acute articular rheumatism, with slight joint manifestations. I feel satisfied as to the immediate dependence of the changes in the heart upon the angina. In some of the cases I had found the heart normal before the illness; in the others the evidence would point toward at least marked increase, if not origination, of endocardial change by the tonsillitis or pharyngitis. In other cases I have strongly suspected the tonsillar origin of endocarditis; but, as the connection could not be proven, I have not added them to this report.

If it is granted, as I think it must be, that these are truly cases of endocarditis, their exact position becomes a matter of some interest. It might be said that the tonsillitis and the endocarditis were simply "rheumatic," and that the cases were examples of larval, latent, or abarticular rheumatism. Such an explanation is by no means satisfactory. In the individual cases there was no preceding history of any of the ordinary rheumatic manifestations, and in the subsequent history of those that I have been able to follow up there have been at no time any evidences of the presence of other members of the "rheumatic group."

I believe these cases to have been plain cases of acute tonsillitis and pharyngitis, having no connection with rheumatism, and that the endocarditis arose as a direct consequence either of infection of the endocardium by micro-organisms, which gained entrance by way of the tonsils, or of structural change in the mitral leaflets, brought about by coagulation necrosis or other result of the chemico-vital action of toxins produced by micro-organisms present in the throat and absorbed from the inflamed tissues. In support of the former theory of their causation, I would here refer only to the fatal case of tonsillitis reported by Charrin in *La Semaine Médicale* for 1897, p. 105, where, at autopsy, the staphylococcus aureus was found both in the tonsil and in the vegetations upon the valves of the pulmonary artery. The only connection that I can see between these cases and rheumatism is in the fact that the tonsillitis and pharyngitis in any of them *might* have been followed by arthritis.

Tonsillitis as a cause of endocarditis is but rarely mentioned in text-books and monographs upon medicine or diagnosis. In looking over most of the standard works of reference and text-books that would mould the thought of student or practitioner, I find that most of them speak of tonsillitis as one of the rheumatic series, and note the possible association of any two of the series apart from any articular manifestations. To my mind this view is not satisfactory, and is based upon the theoretical assumption of a specific poison of rheumatism which can attack various tissues. It would seem far more rational to look upon tonsillitis as an infection (which it undoubtedly is), and to view the endocarditis or the arthritis alone or in combination as the direct and immediate result of the entrance of micro-organisms through, or absorption of toxins from, the tonsil or pharynx.

The occurrence of endocarditis as a direct complication or result of tonsillitis is, however, noted by a few writers without the "rheumatic" explanation. Osler, in his *Practice of Medicine* (pp. 452, 699), mentions the association. Dupré (in the *Traité des Mal. de l'Enfance*, vol. xi. p. 399) speaks of the cases mentioned by Fränkel, Fürbringer, and Sallard.

In Loomis and Thompson's *System of Practical Medicine* mention is briefly made as to this association by R. C. Cabot in his article upon "Acute Follicular Tonsillitis," and by A. L. Loomis in the section upon Endocarditis.

A. Ruault, in the *Traité de Médecine of Charcot, Bouchard, and Brissaud* (T. iii. p. 63), in discussing acute non-specific angina, mentions Fränkel and Fürbringer's cases of ulcerative endocarditis, but says nothing further.

Whittaker, in the *Twentieth Century Practice of Medicine*, vol. iv. p. 156, says: "The tendency of modern belief is to regard the throat as the avenue of entrance for the micro-organisms of rheumatism, and endocarditis has been reported in the course of both simple and epidemic tonsillitis (quinsy)," and on page 147 says also: "The fact that endocarditis may precede the rheumatism, and that either affection may exist independently of the other, has developed the belief that neither one of these affections causes the other, but that both are effects of a common cause." Pott (*Fortschritte der Medecin*, vol. xiii., Nos. 22 and 23), in speaking of the etiology of heart disease in early childhood, speaks of the occurrence of endocardial and pericardial inflammation after an acute fever with angina, but without fixed articular pain. He, however, apparently looks upon these as "larval forms" of rheumatism, as do so many other writers, that an enumeration of them would be useless waste of space.

Haig-Brown (*Lancet*, October 2, 1886, p. 635, and *Medical News*, January 8, 1887, p. 44) found conclusive evidence of endocarditis—*i. e.*, persistence of signs of organic valvular disease—in 8 out of 345 cases of tonsillitis, while in 3 of the 345 cases pericarditis developed.

Boucsein (AMERICAN JOURNAL OF THE MEDICAL SCIENCES, October, 1889) reports two cases of tonsillitis with the development of an apical systolic murmur during the course. Whether these murmurs denoted the existence of endocarditis may possibly be doubtful, as both murmurs disappeared—one in two weeks and the other in four weeks—although the tonsillitis in each case ceased within a few days. He mentions another case with mitral insufficiency, without history of any previous illness save tonsillitis. Of course, direct proof of the dependence of the lesion upon the tonsillitis is in this case insufficient.

In an article upon the bacteriology of angina in the *Annales Suisses des Sciences médicales* for 1895 (abstracted in the *Rev. mens. des Mal. de l'Enfance* for August, 1896, p. 398) Max Stoss mentions two cases of angina accompanied by endocarditis, the causative agent of the former being in one case the streptococcus pyogenes alone; in the other that organism associated with the micrococcus conglomeratus.

Charrin's case (already referred to) was one of tonsillitis followed by bronchopneumonia and death. At autopsy the liver was fatty, the spleen soft, the right lung the seat of bronchopneumonic patches, and there were exuberant vegetations on the pulmonary valves. The staphylococcus aureus was found on the tonsils, in the bronchopneumonic patches, and in the vegetations on the pulmonary leaflets. Here the most probable sequence was tonsillitis, infection of the pulmonary valve leaflets, and bronchopneumonia.

Recently, Benda (*Riforma medica*, December 13, 1898; abstract in the *New York Medical Journal*, April 1, 1899, p. 460) has reported two cases of ulcerative endocarditis, in one of which the port of entry for the infecting agent was the tonsil.

In a letter to the *Lancet* of January 22, 1881 (p. 154), William Stewart refers to the pyæmic nature of rheumatism, and says that the poison arising from diseases of the throat may miss the joints and expend itself upon other fibrous tissues, and mentions among others the endocardium and pericardium. Apparently, therefore, he can be said to attribute to tonsillitis an etiological relation to endocarditis and to rheumatism as separate complications—the view that I have been endeavoring to support.

An interesting discussion upon tonsillitis, its varieties and relations to rheumatism, was held at the meeting of the Section of Laryngology at the annual meeting of the British Medical Association (*British Medical Journal*, September 14, 1889). At this meeting Haig-Brown spoke of the fact that endocarditis occurs sometimes in the course of tonsillitis, and stated that Dr. Osler had written to him that he had seen two cases of tonsillitis, each complicated by endocarditis, and narrating a third case in some detail. With Haig-Brown's view, possibly since that time modified, that tonsillitis is a general disease, having its chief seat of manifestation in the throat, "as in scarlatina," it is difficult to coincide, as it is more reasonable to suppose that the throat is in many diseases inflamed because its tissues are the first involved by the infective agents entering the body by way of their surfaces. Archibald E. Garrod, in the same discussion, made a remark that was one of my strongest incentives to the reporting of these cases. I extract the remark in question: "It is sometimes stated that endocarditis may be developed in such cases (sore-throat with articular pains), and even in those who suffer from sore-throat but have no articular pains. If this can be established a powerful additional argument in favor of the rheumatic origin of the articular pains will be forthcoming. At present, however, the evidence upon this point is still not convincing." Dr. Garrod says, among his conclusions, that when sore-throat is the leading feature of a rheumatic attack there is comparatively little tendency to affection of the endocardium or pericardium. This remark might well hold good if we look upon cases of tonsillitis as the result of a general disease and not as an evidence of the way by which the infecting agent gains access to the body.

R. Hingston Fox at the same meeting said: "With regard to heart-lesions, it is common, even in simple tonsillitis, to find some signs of heart disturbance." He then recounts certain signs which to the doubter would not definitely prove the presence of endocarditis.

De Haviland Hall, in discussing the subject, mentioned a case of tonsillitis with pericardial friction and an apical murmur.

E. Roos (*Berlin. klin. Wochenschr.*, June 18, 1894), in a paper upon rheumatic angina, recites among others a case (V.) almost precisely like those reported above, except for the fact that the patient had in addition some indefinite articular pains without manifest changes in the joints.

A discussion of the relations of the rheumatic manifestations would, as I have before said, unduly lengthen this paper; I would, however, mention that I have seen, and in a future paper hope to report, one or more instances of the occurrence in the course of or after acute tonsillitis of each of the rheumatic associates, with the solitary exception of subcutaneous fibrous nodules, which are conspicuously rare in this part of the world.

My reason for making this report upon what is really but a small portion of a very large subject is to again call attention to a grave complication and sequel to a slight primary disorder, and to a possible factor in the causation of many otherwise unexplainable cases of cardiac lesion, and also to add a small contribution to our knowledge of the etiology of acute articular rheumatism.

TRACHEAL DIASTOLIC SHOCK IN THE DIAGNOSIS OF AORTIC ANEURISM.

WITH A STUDY OF THE VALUE OF THE TRACHEAL TUG.

By J. N. Hall, M.D.,
PROFESSOR OF MEDICINE IN GROSS MEDICAL COLLEGE; VISITING PHYSICIAN TO THE ARAPAHOE COUNTY HOSPITAL AND TO ST. ANTHONY'S HOSPITAL, DENVER, COL.

For more than a year my attention has been drawn to an element in the diagnosis of aortic aneurism not heretofore mentioned, to my knowledge, and certainly not by the authors who have especially written upon this disease. It is best described by the title I have given it above.

Since the report of Surgeon-Major Oliver,[1] and the subsequent work of Ross and McDonnell,[2] the value of the tracheal tug in the diagnosis of aortic aneurism has been quite definitely fixed. Yet certain observers have thrown some doubt upon its reliability. Grimsdale's[3] report, stating that " the tug occurs distinctly in 16 per cent. of all cases taken at random, and in all respects is indistinguishable from that occurring in such cases of aneurism as have fallen under my notice," I cannot accept as representing the actual facts. After the examinations of a greater number of patients than that upon which he based his conclusions, I believe that I have never seen the phenomenon present in any case in such degree as to constitute the "tug" described by Oliver, which did not present some other of the clinical signs of aortic aneurism, although I have often seen the " downward pulsation" which certain writers have evidently mistaken for Oliver's sign. It is essential that we should thoroughly grasp the idea that the " tug" is a distinct and forcible downward pull, and not at all a " downward pulsation." Packard's[4] observations upon this point are sound. Ewart[5] found that in 50 per cent. of sixty males and 28 per cent. of sixty-seven females a certain degree of tracheal tugging could be noted. In the male patients were included three cases of thoracic aneurism, and these presented the only instances of *marked* tracheal tugging. This writer notes the increased force of the tug in forcible inspiration, during which the larynx descends. Cardiac excitement also favored its development, especially in females. He also states that aneurism of the ascending portion of the arch does not cause tugging, being herein in accord with most writers.

---

[1] Lancet, 1878.

[2] Ibid, 1891.

[3] London Practitioner, 1892.

[4] Medical and Surgical Reporter, Philadelphia, 1897.

[5] British Medical Journal, 1892.

It is scarcely possible to study the figures given by the last two writers without a conviction that they have classed simple pulsation transmitted to the larynx—a comparatively frequent phenomenon in my experience—as tracheal tugging, especially as Ewart admitted that the only three cases in which the symptom was well marked were undoubtedly of aneurismal nature.

Toulmin[1] mentions that in certain cases tugging may be found during inspiration only. Since reading this article I have noted the same fact. These cases should properly be thrown out, not being of any diagnostic value with relation to aortic aneurism. His conclusions seem justifiable, viz.:

"1. An up-and-down movement of the trachea occurs in many healthy individuals, and accompanies other diseases than aneurism.

"2. In such cases the movement is much affected by respiration, in the majority of cases being present during inspiration only.

"3. In a very small percentage of cases distinct tugging of the trachea may be present without involvement of the aorta either by aneurism or simple dilatation."

A. Fraenkel[2] reports a case of distinct tugging in aneurism of the ascending portion of the arch, but it was explained at autopsy by the discovery of firm adhesions between the sac and the trachea. He has seen the phenomenon in a case of apparently malignant tumor; but as no autopsy was held, aneurism could not be excluded.

Pansini[3] mentions that Castellino saw two cases of œsophageal tumor accompanied by tracheal pulsation not affected by deep inspiration. The only reference available to me was not sufficiently explicit to be of any value in this discussion, however.

These reports have somewhat weakened the supposed claim of tracheal tugging to the position of being practically a pathognomonic sign of aortic aneurism, for it is in the differential diagnosis of solid tumor and aneurism that the greatest difficulty is generally found. It is in this connection that the sign to be described should be of most value.

This sign is, in brief, the transmission of the diastolic shock, originating at the time of the closure of the aortic valves, through the aneurism to the trachea, and manifested by a distinct, sharp impulse following the tracheal tug at the same interval as that between the apex-beat and the closure of the aortic segments. This diastolic shock is so well marked in the average case of aneurism that it is inexplicable that it should have apparently escaped the attention of clinicians in the past.

The value of diastolic shock, as manifested in the tumor when the aneurism reaches the chest-wall, has been well established. Thus, Osler says: "By far the most valuable sign of aneurism is the diastolic shock so often to be felt, and in a majority of cases to be heard, over the sac. This is rarely, if ever, present in mediastinal growths, even when they perforate the sternum and have communicated pulsation." The sign just described, when present, gives us information of equal value, I believe, in cases in which the aneurism forms no external tumor, or, if presenting such tumor, gives no diastolic shock—the very cases in which we need this information most urgently.

---

[1] Journal of American Medical Association, 1897.

[2] Deutsche med. Wochenschrift, xxv., 1.

[3] Quoted by Fraenkel.

I first noticed this diastolic tracheal phenomenon in the first of the cases briefly quoted below, and have found it nearly as well marked in the other instances given. Several of the cases have been reported in full elsewhere, as noted; but as this sign was then under investigation it was not mentioned, although recorded in the clinical records of the Arapahoe County Hospital and in my case-book.

CASE I.—This was the case of Frank C., reported in the *Medical Fortnightly* of December 1, 1898. The diagnosis of aneurism of the transverse portion of the arch of the aorta was based upon the presence of dilatation of the left pupil, paralysis of the left vocal cord, brazen cough, aphonia, pain, cutting off respiratory sounds in the left lung from pressure from the left bronchus, repeated hæmoptysis, and, after the time of the report mentioned, delay and weakening of the left radial pulse, a pulsating tumor, the presence of which was verified by the fluoroscope, dysphagia, and tracheal tugging. This was well marked, and the diastolic tracheal shock was exceedingly distinct. The patient finally went to Pennsylvania, where I lost track of him. As he was alive and able to leave the hospital to travel two thousand miles alone, eighteen months after first entering the hospital, and appeared to be of good color, with no glandular involvement—in other words, as no cachexia had developed, or other definite signs of mediastinal malignant growth—there is scarcely a possibility of disputing the diagnosis of the aortic aneurism, although not confirmed by autopsy.

CASE II.—This was S., a colored male, fifty-two years of age, whose history, with the results of the autopsy, was published in the *Texas Medical Journal* of April, 1899. It will suffice to say that tracheal tugging and diastolic tracheal shock were fairly marked, and that an aneurism about three by four inches in extent, involving the beginning of the descending portion of the arch of the aorta and directly in contact with the left bronchus, was found post-mortem. In this case the diastolic shock could be felt *in the external tumor* only during the last two weeks of life, although distinctly felt in the trachea from the time of the first examination.

CASE III.—Mc——, thirty-eight years of age, a patient of Dr. C. P. Conroy's, with whom I recently saw him. The man was of powerful build, and in an emergency he held up one hundred and fifty feet of of two-and-one-half-inch iron pipe, probably weighing one thousand pounds, a short time to prevent its falling into a well. He felt severe pain in the upper chest, and in a few days developed hoarseness, with paralysis of the left vocal cord, dilatation of the left pupil, thrill of great intensity at the upper end of the sternum to the left, with loud systolic murmur, vigorous pulsation, and flatness upon percussion. Left radial pulse delayed and not over one-third the strength and volume of the right. Respiration and voice were feeble over the left back. Tracheal tugging was very distinct. Although no diastolic shock could be felt over the pulsating area, it was exceedingly distinct in the larynx.

This history, with the signs and symptoms, so entirely consistent with the supposition of rupture of one of the tunics of the aortic arch, with a subsequently developing aneurism, and so impossible of explanation by any other hypothesis, led Dr. Conroy to make the diagnosis above given, in which I unreservedly concurred. The patient died suddenly on June 18th from hemorrhage. A large aneurism of the transverse and descending portions of the aortic arch was found, with rupture into the trachea at the origin of the left bronchus.

CASE IV.—G. W., seen through the kindness of Dr. E. R. Axtell, at the Arapahoe County Hospital. He was a laborer, forty-two years of age, with a history of syphilis. He had well-marked chronic parenchymatous nephritis, with extensive dropsy. There was extensive dulness over the upper left chest, without murmur, pulsation, or thrill; dilated left pupil, hoarseness, dyspnœa, and cutting off of the respiratory sounds from the left lung. The cricoid cartilage showed a moderate downward pulsation, but not a distinct tug, and no diastolic shock. On this account, with the absence of murmur, pulsation, and thrill, I felt less positive of the diagnosis of aneurism than did Dr. Axtell, believing that a solid tumor was quite possible.

The *autopsy* was held on October 19th. The points of interest to us in the examination were the finding of signs of visceral syphilis in the liver, the well-marked chronic parenchymatous nephritis, and an aneurism of the aorta, beginning abruptly two inches from the origin of the vessel. It was globular, and five inches in diameter, but had produced no erosion of bone. It was so filled with layers of fibrin that only a channel about the size of the normal aorta remained open. At least two inches of solid fibrin were thus present between the moving current and the parts around the tumor. The absence of expansile pulsation, of marked tracheal tugging, and of diastolic shock were thus easily explained, for the tumor was really more nearly a solid one than a vascular one, owing to the very firm deposit of fibrin through which the blood-current passed. In other words, an aneurism gives rise to its characteristic signs because of its expansibility, and if this be impaired, as in this case, it may give rise to signs more nearly like those of a solid tumor.

I have recently seen a case of œsophageal cancer, with Dr. Leonard Freeman, in which a mass the size of a lemon was found behind the manubrium sterni at autopsy. No tracheal signs were present during life. I mention the case because the tumor mass was in intimate contact with the bloodvessels and trachea, but still gave no signs of communicated pulsation.

Since the observation of the first case I have examined scores of supposedly non-aneurismal patients with various diseases without finding one in whom there could be any question of *marked* tracheal tugging or even a suspicion of tracheal diastolic shock. In two patients with well-advanced pulmonary tuberculosis there was a moderate impulse to be felt at the cricoid cartilage with the cardiac systole, and in several other patients a slight impulse existed, especially during inspiration; but in none was there a distinct downward tug, such as is found in aneurism. My own opinion of the value of the simple tracheal tug is, therefore, a high one. If investigation of the value of the tracheal diastolic shock by other writers confirms my own ideas I believe that the value of the tracheal element in the diagnosis of the aortic aneurism will be distinctly enhanced.

The crucial test of the value of the sign under discussion should be in differentiating aneurism from solid thoracic tumor in cases not involving the chest-wall. We must conclude, however, that if diastolic shock is of value--as it certainly is—in establishing the diagnosis of aneurism in case the tumor is accessible to palpation, it should be of equal value in case no palpable tumor exists, if transmitted through the vascular tumor to the trachea as in the cases quoted.

I shall await reports as to the value of this sign in such cases with the greatest interest, and hope to be able to record in future my own further conclusions.

REPORT OF A FAMILY OUTBREAK OF TRICHINOSIS.

By George Blumer, M.D.,
DIRECTOR OF THE BENDER HYGIENIC LABORATORY, ALBANY, N. Y.,
AND
Leo Haendel Neuman, M.D.,
LECTURER ON SYMPTOMATOLOGY, ALBANY MEDICAL COLLEGE.

Since the trichina spiralis was first described in the United States by Bowditch and J. B. S. Jackson[1] numerous instances of both the sporadic and epidemic forms of trichinosis have been reported from various sections of the country. In reviewing and tabulating the American literature on the subject up to 1897, Packard[2] found that not only the largest number of cases, but also the largest number of reports had emanated from New York State. In adding another to the already lengthy list of reports from this State we would give as our excuse the occurrence of certain clinical peculiarities in the cases and the renewed interest in the disease which has recently been aroused by the publications of Osler[3] on the sporadic form, and of Brown[4] and others on the peculiar blood changes.

[1] Bowditch and J B S. Jackson. Boston Medical and Surgical Journal, 1842, vol. xxiv., No. 8.

[2] Packard. Journal of the American Medical Association, 1897, vol. xxix. p. 59.

[3] Osler. The American Journal of the Medical Sciences, March, 1899.

[4] Brown. Johns Hopkins Hospital Bulletin, April, 1897; Journal of Experimental Medicine, 1898, vol. iii., No. 3; Boston Medical and Surgical Journal, September 1, 1898; Medical News, January 7, 1899.

The epidemic which we report occurred in the city of Albany, and implicated two Italian families, numbering in all nine persons. Eight of the patients were under the care of Dr. Neuman, while the ninth was attended by Dr. Thomas A. Ryan, to whom we are indebted for permission to report the case.

The clinical histories of the cases briefly related are as follows:

CASE I.—D. V., the father of one of the families; aged fifty-four years. Was taken severely ill on February 26th after malaise and anorexia, lasting for a week. His chief complaint was of pain, severe all over the body, but excruciating at the pit of the stomach, from whence it radiated to the back, between the shoulder-blades. His bowels were constipated. He had no nausea or vomiting. When first seen the face had an anxious look, and was pale and œdematous. The hands were also œdematous, but less so than the face. The tongue was coated with a thick, brownish coat. Pulse 92, temperature 103° F., respirations 28, and shallow. The thoracic organs were normal. The abdomen was distended, with tenderness of its walls, but the abdominal organs were normal.

When seen on February 28th the general pains continued with great severity, and there was a sharp, stabbing pain in the left side of the thorax, accompanied by a hard cough, but no expectoration. Physical examination showed slight dulness over the lower lobe of the left lung and a distant to-and-fro friction rub.

March 1*st* The dulness persisted; it did not change on change of position. The breath-sounds were distant, the friction rub still present. The face and hands were still swollen, the latter more markedly than at the last note, and there was swelling of the legs from the calves down.

2*d*. The patient has some photophobia. He has been delirious at night and has been sweating profusely. Temperature 102.4° F., pulse 92, respiration 26.

4*th*. The patient is very weak. Five lenticular, rose colored spots were seen on the abdomen; they disappear on pressure.

5*th*. He has difficulty in swallowing. A few fresh spots on the abdomen.

7*th*. Patient has been crying all night with severe pain. Is very restless. The dulness over the left lower lobe is increased; there is slight expectoration of stringy mucus.

8*th*. He is markedly delirious at night. The back of the scalp is tender. The spots on the abdomen are still present. Heart-sounds are muffled. Abdominal organs not palpable. The difficulty in swallowing persists. The bowels are obstinately constipated. Pains in the epigastric region are very severe. He has numbness in the arms and legs; the swelling of the latter is more marked, and they are so sensitive that he can hardly bear the bedclothes upon them. Blood examination: Leucocytes, 19,000; eosinophiles, 40.6 per cent.

11*th*. He has had nausea, but no vomiting. Is sleeping better, and swallowing is improved. The pain in the right leg has been unusually severe, and it is swollen much more than the left. The pain is most severe in the region of the femoral vein. The leg looks pale, and the swelling is quite uniform.

13*th*. The swelling of the right leg has progressed; a distinct thickening of the femoral vein can be made out. Insomnia and perspiration continue. Tenderness at insertion of muscles is marked. Blood examination: Leucocytes, 18,000.

16th. The œdema of the face is abating. The abdominal eruption has gone. The swelling of the legs is also disappearing.

19th. Blood examination: Leucocytes, 12,400; eosinophiles, 37.4 per cent. The patient is improving. There is an erythematous rash all over the trunk, in the form of irregularly circular patches from 1 to 2 cm. in diameter.

23d. He is improving slowly. Still has a sense of oppression in the pit of the stomach and colicky pain. The urine, which had previously been normal, shows a trace of albumin and a few hyaline casts. Urea, 3.5 per cent. Heart-sounds feeble; lungs normal, except for slight dulness over the left lower lobe.

26th. Blood examination: Leucocytes, 20,600; eosinophiles, 14.8 per cent.

April 1st. Blood examination: Leucocytes, 13,200; eosinophiles, 10 per cent.

2d. Slowly improving. Still has pain in the right leg and over the pit of the stomach.

May 20th. Practically convalescent. Since his convalescence, however, there is a certain rigidity of the muscles, simulating that seen in paralysis agitans, but there is no tremor present.

Case II.—Mary C., aged twenty-four years; married daughter of D. V. Her illness began with malaise and anorexia, accompanied by a dull headache, most marked in the frontal and occipital regions. She took to bed February 16th, after these symptoms had persisted for a week. She complained of cough, with white, stringy expectoration. She was very thirsty. No nose-bleed, no diarrhœa. The bowels were constipated.

When first seen, on February 23d, the tongue was coated, except at the tip, with a whitish coat. The skin was sallow and waxy, the expression listless, mentalization slow—a picture suggesting the typhoid state. The temperature was 100.6° F., pulse 90, respiration 20. The heart-sounds were normal. The lungs showed the physical signs of bronchitis. Liver dulness slightly increased. Spleen not palpable. There was diffuse tenderness in the epigastric region, and a localized area of exquisite tenderness, the size of a twenty-five-cent piece, immediately below the ensiform cartilage. There was gurgling, but no tenderness, in the right iliac fossa. Urine showed a trace of albumin; diazo-reaction positive; urea, 3 per cent.

25th. There is œdema of the lower eyelids, extending down onto the cheeks.

28th. The œdema has extended, giving the whole face a bloated, waxy appearance. She complains of pain in the lower left chest.

March 1st. Patient had a chill this evening. Pain in the chest has increased, and is stabbing in character; she is dyspnœic. There is slight dulness over the lower left chest in front and behind, with a friction rub. Heart-sounds loud and clear.

2d. Dyspnœa continues. Pain is lessened. There is dulness over the left lower lobe, the breath-sounds being distant and faint. Heart-sounds weak and muffled. Spleen easily palpable.

5th. She complains of difficult deglutition. Diarrhœa is present. The pulse is dicrotic.

6th. Patient had six watery movements during the night. Dyspnœa is marked; it amounts to orthopnœa. A systolic murmur transmitted to the axilla can be heard at the apex.

8th. The patient complains of insomnia. She has some muscular tenderness. The ankles are slightly œdematous. She sweats a great deal. Other symptoms as before. Blood examination: Leucocytes, 8400; eosinophiles, 21.8 per cent.

12th. Blood examination: Leucocytes, 20,000; eosinophiles, 23.4 per cent.

14th. Improving; diarrhœa still present; pleurisy clearing up; mitral murmur more distinct. Apex displaced downward and to the left.

16th. Œdema of face nearly gone; ankles still œdematous; dyspnœa present on slightest exertion; patient feels weak.

19th. Blood examination: Leucocytes, 17,200; eosinophiles, 40 per cent.

26th. Blood examination: Leucocytes, 12,000; eosinophiles, 30.8 per cent.

April 1st. Blood examination: Leucocytes, 16,000; eosinophiles, 41.5 per cent.

10th. The patient is gradually gaining strength.

July 2d. Patient feels fairly well, but exertion still brings on dyspnœa. There is no muscular tenderness, and the œdema has disappeared.

CASE III.—A. V., a nephew of D. V., aged twenty-four years. This patient was attended by Dr. Ryan. He was first seen on March 2d, at which time he had a temperature of 104° F. and the physical signs of a bronchopneumonia. He had no nausea or vomiting, but a diarrhœa of moderate severity, the movements being of a pea-soup character. He had slight muscular tenderness, especially at the lower ends of both biceps muscles. The face was slightly œdematous and pale. He sweated profusely.

March 8th. Blood examination: Leucocytes, 24,000; eosinophiles, 33.3 per cent. The patient consented to have a small piece of muscle removed, and Dr. Ryan kindly excised a portion of the lower end of the left biceps. Microscopical examination showed a fair number of motile, non-encapsulated trichinæ.

11th. He left the Albany Hospital, which he had entered on the 2d, and returned home, his temperature being normal. After a few days his fever returned and was present for about three weeks, the temperature being of a remittent type. He had a few spots on the abdomen simulating rose-spots. Profuse sweating was present. Cramps in the arms and legs were severe. He had persistent insomnia. He was able to get up five weeks from the second attack, much emaciated and very weak.

12th. Blood examination: Leucocytes, 14,000; eosinophiles, 36 per cent.

19th. Blood examination: Leucocytes, 20,600; eosinophiles, 27.6 per cent.

26th. Blood examination: Leucocytes, 18,000; eosinophiles, 23.25 per cent.

April 1st. Blood examination: Leucocytes, 15,200; eosinophiles, 28.6 per cent.

CASE IV.—Mrs. D. V., aged forty-nine years, wife of D. V. On March 5th the patient was seized with a severe chill, lasting from fifteen to twenty minutes and accompanied by severe headache and general muscular pains. There was no gastro-intestinal disturbance. She was first seen March 6th. At this time she had marked dyspnœa, with some cyanosis. Temperature was 103.5° F., pulse 104, respiration 38.

Physical examination showed a consolidation of the upper lobe of the left lung, over which bronchial breathing and crepitant râles could be heard. The heart-sounds were weak, the second pulmonic being accentuated. Perspiration was profuse. Sputum frothy and mucous in character.

March 7th. Lower right lobe also shows an area of consolidation. The face is very œdematous, so much so that the eyelids can scarcely be opened. Wrists and hands swollen and tender; sputum is rusty. Temperature 104° F., pulse 109, respiration 40. The urine contains a trace of albumin, but no casts; urea, 2.9 per cent.

8th. When seen at 11 A.M. was weak and depressed. At 1.30 P.M. Dr. Neuman was called and found the patient in a collapsed condition. The pulse was small, and a profuse, clammy sweat was present. Temperature was 97.4° F., pulse 90, respiration 40. At 4 P.M. she had rallied; the skin was warm and the temperature had reached 99.2° F. This evidently was a critical fall of temperature. Blood examination: Leucocytes, 8000; eosinophiles, 33.6 per cent.

12th. Blood examination: Leucocytes, count lost; eosinophiles, 27 per cent.

16th. The patient has been gradually improving; she is up and about the house, but feels weak. States that she would be in bed, but that so many of the family are sick some one must do the housework. She still complains of pain in the epigastric region. The œdema of the face has almost disappeared.

19th. Blood examination: Leucocytes, 12,400; eosinophiles, 32.8 per cent.

26th. Blood examination: Leucocytes, 13,200; eosinophiles, 30 per cent.

CASE V.—T. V., aged twenty-six years, son of D. V. He was first seen February 23d. Had been feeling unwell for a week or ten days, with anorexia and constipation, but no nausea, vomiting, or diarrhœa. He complained of pains all over the body, chilly sensations, and photophobia. Examination showed slight tenderness of the eyeballs, but no muscular tenderness. The face and neck were very œdematous, particularly the latter, which was swollen so as to be on a line with the jaw. The thoracic organs were normal. The liver extended two fingerbreadths below the margin of the ribs. The spleen was palpable; no rose-spots. Temperature 101.2° F., pulse 82.

February 26th. Patient has slight headache; abdomen tympanitic; no abdominal tenderness. A few rose-colored spots on the abdominal wall, which disappeared on pressure.

28th. The rose-colored spots are still present on the abdomen. Temperature 101.2° F.

March 2d. Abdominal eruption has gone. Temperature 100° F.

4th. The face is still very œdematous; he complains of stiffness in the arms.

6th. He complains of restlessness. The œdema of the neck is abating. Temperature 102.4° F.

8th. The patient is feeling better, but sweats a great deal. Pressure over the insertions of the muscles is painful. Blood examination: Leucocytes, 8000; eosinophiles, 50.2 per cent.

12th. Blood examination: Leucocytes, 14,000; eosinophiles, 31 8 per cent

19th. The patient feels well, but has a waxy pallor He is still weak, and has some pain in the arms, back, and legs; this is worse on motion; gait normal Temperature 98° F Blood examination: Leucocytes, 18,600; eosinophiles, 42 2 per cent.

26th Blood examination: Leucocytes, 14,600; eosinophiles, 43 per cent.

Case VI.—R G., aged thirty years, friend of the V. family; was first seen on March 4th. He complained of malaise, anorexia, and some dyspnœa on exertion. He had a headache, was thirsty, and could not sleep. Examination showed that his face was œdematous and had a waxy pallor. The thoracic organs were normal; the liver and spleen both palpable. Temperature 102.6° F., pulse 84.

March 6th. Condition about the same. Temperature: Morning, 102° F.; evening, 104° F. .

9th The patient feels better; the face is still œdematous There is muscular soreness at the insertion of the pectoralis major. There is slight feeling of distress in the epigastric region Blood examination: Leucocytes, 14,000; eosinophiles, 32.16 per cent.

11th Has been at work, and feels fairly well. There is still some muscular tenderness. Nothing peculiar in the gait.

19th. Blood examination: Leucocytes, 17,200; eosinophiles, 46 per cent.

26th. Blood examination: Leucocytes, 8000; eosinophiles, 35.4 per cent.

April 9th. Blood examination: Leucocytes, 6000; eosinophiles, 16.6 per cent.

Case VII.—J. V., aged twenty-one years, son of D. V. He had been treated twice within the last two years for attacks of typhoid fever. He was first seen on February 26th, complaining of aching and stiffness in the back and legs, and thirst. Examination showed a waxy œdema of the face, particularly of the cheeks and lower eyelids. There was some swelling at the angles of the jaw. No muscular tenderness could be made out. Thoracic and abdominal organs normal. Temperature 99° F.

March 4th. The swelling of the face had nearly disappeared. The patient feels well, but looks pale.

12th. Blood examination: Leucocytes, 16,000; eosinophiles, 31 per cent.

19th. Blood examination: Leucocytes, 23,000; eosinophiles, 37 per cent.

26th. Blood examination: Leucocytes, 16,600; eosinophiles, 39.4 per cent.

April 1st. Blood examination: Leucocytes, 8600; eosinophiles, 35.6 per cent.

16th. Perfectly well. There has never been any muscular tenderness.

Case VIII.—R. V., aged eighteen years, son of D. V. The patient was sent to Dr. Neuman's office, February 10th, on an errand for his father. Incidentally he stated that two or three weeks previously he had had pains in the back, arms, and legs, lasting for some days, and had had diarrhœa for a day or two. The pains were fleeting and transitory in character, and were followed by some muscular stiffness. During the same period of time the patient sweated profusely at night. Physical examination was negative.

March 12*th*. Blood examination: Leucocytes, 10,000; eosinophiles, 35 per cent.

19*th*. Blood examination: Leucocytes, 14,600; eosinophiles, 50.4 per cent.

26*th*. Blood examination: Leucocytes, 12,600; eosinophiles, 29.75 per cent.

April 1*st*. Blood examination: Leucocytes, 12,600; eosinophiles, 38 per cent.

CASE IX.—Mrs. G., aged nineteen years, wife of R. G. Did not complain at all, but was questioned at the time of her husband's illness. Stated that she had slight swelling of the face for one or two days, but otherwise felt well. Physical examination was negative, except for slight tenderness over the lower ends of the biceps muscles. Pulse and temperature were normal.

March 9*th*. Blood examination: Leucocytes, 12,400; eosinophiles, 17 per cent.

19*th*. Blood examination: Leucocytes, 15,200; eosinophiles, 20 per cent.

26*th*. Blood examination: Leucocytes, 12,600; eosinophiles, 13.5 per cent.

April 9*th*. Blood examination: Leucocytes, 10,000; eosinophiles, 8 per cent.

An inquiry into the source of infection in this outbreak elicited the fact that the only article of diet which had been partaken of by all nine patients was some home-made sausage made by the V. family. A short time preceding the outbreak of the disease a member of the V. family had lunched with G. and his wife, and had shared some of his sausage with them. Examination of the sausage showed it to be mainly composed of irregularly cubical pieces of pork cut by hand, and often measuring as much as 1 centimetre in diameter. The patients stated that this sausage was twice cooked before being eaten—once at the time of manufacture, when it was submitted to the action of boiling lard, and again just before it was eaten, when it was thoroughly fried. On close questioning the fact was elicited that on rare occasions the frying was omitted, but that the sausage was never eaten without some form of cooking.

A microscopical examination of the sausage showed that many of the pieces of pork contained numerous partly encapsulated trichinæ The pieces containing the parasite were very irregularly distributed, some sausages containing hardly any infected pork, while in others almost every piece was infected. This was explained by the fact that the meat was bought at a wholesale house, in the form of "scraps," these scraps being made up of a mixture of odds and ends of pork left over from a number of carcasses.

From a clinical stand-point, this outbreak is mainly interesting on account of the almost entire absence in most of the cases of the preliminary gastro-intestinal disturbances. Although anorexia was present, and in one or two of the severer cases severe epigastric pain, with marked tenderness, neither nausea, vomiting, nor diarrhœa occurred in most instances. In this the outbreak resembles very closely the form described by Renz,[1] early in the history of the disease, as "insidious trichinosis," a form much more common in sporadic than in epidemic cases. Another prominent symptom, either lacking or very slightly marked in most of the cases, was muscular tenderness; even when noted it had to be searched for carefully, and was not well marked in any case except Case I.

General muscular aching, however, was present as an early symptom in all cases, and its association with fever and bronchial symptoms would have led to a suspicion of la grippe, but for the œdema of the face.

The resemblance to typhoid fever, so frequently noted in other epidemics, was well illustrated in this one by the course of the fever, the apathetic condition of the patient, and the accompanying bronchitis in Cases II. and III.

The one symptom which was prominent in all the cases was the œdema of the face; it was extremely characteristic, in no case suggesting inflammatory œdema, and resembling most nearly the œdema of chronic Bright's disease, on account of the peculiar waxy color which accompanied it, although much more extensive than in this disease.

Fever was present in all but the mildest cases, usually accompanied by severe sweating, and in the severe cases insomnia, which did not yield readily to the ordinary hypnotics.

The various complications of the disease as observed in these cases, the endocarditis in Case II., the lung complications in the first four cases, the spots simulating rose-spots, and the erythema, have been observed before in epidemic and sporadic cases, both in this country and in Germany. The occurrence of a femoral thrombosis, such as occurred in Case I., seems, however, to be very unusual. In none of the cases was there noted the tenderness of the heels, with the accompanying toe-walking, as described by E. R. Hun[2] and Wendt.[3]

The great variation in the severity of the disease in the different individuals was no doubt due to the fact, already mentioned, that the sausages, being made of pork which originated from different animals, were some of them much more extensively infected than others.

The origin of this outbreak illustrates very forcibly the necessity of thorough cooking for pork; certainly, it must be very unusual for the meat to be cooked twice, as it was in this instance, and still retain its infectivity. That this does occur, however, was shown in the Hettstädt epidemic,[1] in which the sausage causing the infection had been both smoked and roasted.

---

[1] Renz. Cited by Niemeyer, Practice of Medicine, 1877, vol. ii.

[2] E. R. Hun. Transactions of the Medical Society of New York, 1869.

[3] Wendt. THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, April, 1878.

Doubtless the large size of the pieces of pork was responsible for the fact that in our cases the cooking failed to kill the trichinæ, for the experiments of Hertwig[2] showed that pieces of infected pork the thickness of the thumb could be boiled for twenty-two minutes without killing the trichinæ.

The results of the blood examinations in this outbreak confirm the observations originally made on the blood in this disease by Brown,[3] and subsequently confirmed by Cabot,[4] Gwyn,[5] Atkinson,[6] and Stump.[7] In Brown's original study of three cases the main changes noted in the blood were a leucocytosis, in which the increase in the leucocytes occurred in the eosinophiles, a corresponding decrease in the neutrophiles, and in some cases a decrease in the small mononuclear leucocytes at the beginning of the attack. The leucocytes varied in number in Brown's cases from 8000 to 35,000 per cubic millimetre, and the eosinophiles varied from 8 per cent. to 68 per cent. In Cabot's case a differential count showed 27 per cent of eosinophiles. In Gwyn's case the one leucocyte count noted is 17,000, while the eosinophiles varied between 33 per cent and 65.9 per cent. In Atkinson's case the eosinophiles reached as high as 58 per cent., and in Stump's case as high as 52 per cent.

In the cases in the outbreak here reported it will be seen from the accompanying table that a leucocytosis was present in every case, and that the differential count showed this to be due to the great increase in the number of eosinophiles Furthermore, as already noted by Brown, there existed with the eosinophilia a corresponding decrease in the neutrophiles, and in some cases, early in the disease, a decrease in the number of small mononuclears. With regard to the eosinophilia in our cases, it was perfectly easy in most of them to make the diagnosis from the fresh blood specimen; in fact, the blood picture was extremely typical and striking. The cases reported by the above-mentioned observers, being sporadic in character and few in number, it was impossible for them to make comparisons regarding any ratio which might exist between the leucocytosis and the severity of the attack or between the eosinophilia and the severity of the attack. It can be seen from a study of our cases that the intensity of the disease did not necessarily correspond to the degree of the eosinophilia, as, for example, R. V., who had an exceedingly mild attack of the disease, showed a maximum of over 50 per cent. of eosinophiles, while the highest percentage reached by D. V., who had a severe attack, was 40.6 per cent. On the other hand, it would seem that the degree of leucocytosis did, in a general way, correspond to the severity of the attack, Cases I., II , III., and VI , relatively severe cases, having a higher and more persistent leucocytosis than the milder cases.

---

[1] See Keller, THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, April, 1864, vol. lxxv.

[2] Hertwig. Quoted by J. D. Jackson, THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, January, 1867.

[3] Brown. Op. cit.

[4] Cabot. Boston Medical and Surgical Journal, 1897, vol. cxxxvii. p. 676.

[5] Gwyn. Centralblatt f. Bakt., Band xxvi. No. 1.

[6] Atkinson. Philadelphia Med. Jour., June 3, 1899.

[7] Stump. Ibid., June 17, 1899.

TABLE SHOWING THE DIFFERENTIAL COUNTS IN THE ABOVE CASES. BLOOD FILMS FIXED BY HEAT AND STAINED WITH EHRLICH'S TRIPLE STAIN.

Name.	Date.	No. of leucocytes.	Polynuclears.	Transitionals and large mononuclears.	Small mononuclears.	Eosinophiles.
Case 1. D. V.	March 8	19,000	47.4 per ct.	8.8 per ct.	3.2 per ct.	40.6 per ct.
	" 13	18.000				
	" 19	12,400	50.6 "	4.4 "	7.6 "	37.4 "
	" 26	20,600	69.6 "	5.6 "	10.0 "	14.8 "
	April 1	13,200	73.0 "	5.0 "	12.0 "	10.0 "
Case 2. Mary C.	March 8	8,400	61.4 "	6.8 "	10.0 "	21.8 "
	" 12	20,000	51.6 "	10.4 "	14.6 "	23.4 "
	" 19	17,200	39.0 "	4.8 "	16.2 "	40.0 "
	" 26	12,000	48.0 "	6.6 "	14.6 "	30.8 "
	April 1	16,000	42.0 "	4.3 "	12.2 "	41.5 "
Case 3. A. V.	March 8	24,000	56.8 "	6.4 "	3.6 "	33.3 "
	" 12	14,000	52.4 "	3.8 "	7.8 "	36.0 "
	" 19	20,600	64.4 "	2.8 "	5.2 "	27.6 "
	" 26	18,000	66.25 "	4.0 "	6.5 "	23.25 "
	April 1	15,200	56.6 "	4.4 "	10.4 "	28.6 "
Case 4. Mrs. D. V.	March 8	8,000	51.0 "	7.8 "	7 6 "	33.6 "
	" 12	....	50.8 "	4.2 "	18.0 "	27 0 "
	" 19	12,400	50.6 "	5.6 "	11.0 "	32.8 "
	" 26	13,200	54.0 "	5.0 "	11.0 "	30.0 "
Case 5. T. V.	March 8	8,000	32.6 "	10.8 "	6.4 "	50.2 "
	" 12	14,000	49.0 "	4.2 "	15.0 "	31.8 "
	" 19	18,600	41.4 "	5.6 "	10.8 "	42.2 "
	" 26	14,600	35.0 "	3.5 "	18.5 "	43.0 "
Case 6. R. G.	March 9	14,000	45.6 "	15.16 "	7.0 "	32.16 "
	" 19	17,200	45 4 "	2.6 "	6.0 "	46.0 "
	" 26	8,000	48 8 "	5.0 "	10 8 "	35.4 "
	April 9	6,000	64.4 "	6.8 "	12.2 "	16.6 "
Case 7. J. V.	Mar. 12	16,000	44.0 "	9.2 "	15.8 "	31.0 "
	" 19	23 000	53.2 "	2.8 "	6.2 "	37.0 "
	" 26	16,600	41.6 "	6.0 "	13 0 "	39.4 "
	April 1	8,600	39.3 "	9.0 "	16.1 "	35.6 "
Case 8. R. V.	Mar. 12	10,000	39.0 "	6.0 "	20.0 "	35.0 "
	" 19	14,600	36.0 "	4.8 "	8.5 "	50.4 "
	" 26	12,600	55.5 "	5.5 "	9.25 "	29.75 "
	April 1	12,600	44.0 "	7.0 "	5.5 "	38.0 "
Case 9. Mrs. R. G.	Mar. 9	12,400	48.0 "	9.6 "	25.4 "	17.0 "
	" 19	15,200	59.2 "	4.0 "	16.8 "	20.0 "
	" 26	12,600	67.0 "	6.5 "	13.0 "	13.5 "
	April 9	10,000	74.0 "	5.0 "	13.0 "	8.0 "

With regard to the origin of the eosinophiles in these cases, we can only say that we were unable to observe any evidence in the blood itself of a transformation of neutrophiles into eosinophiles. We were unable to procure a sufficient quantity of muscle to confirm or refute Brown's observation, that the change takes place in the muscular tissue.

It is unfortunate that our cases could not be kept under observation longer, in order to observe the duration of the eosinophilia. The only two observations on this point that we have been able to discover are Brown's third case, where the blood was normal five months after the patient's discharge with an eosinophilia of 34.7 per cent., and Stump's case, where there was still an eosinophilia of 15 per cent. after four and one-half months.

As a result of the study of this outbreak we would conclude:

1. That in some epidemics of trichinosis one or more of the most characteristic symptoms may be lacking in the majority of the patients.

2. That in these cases the examination of the blood is of the greatest value, as pathognomonic changes are found in it, consisting in (*a*) an eosinophile leucocytosis, (*b*) a relative decrease in the neutrophiles, and (*c*) in many, but not all, cases a decrease in the small mononuclear leucocytes early in the disease.

THE RELATION OF MIGRAINE TO EPILEPSY.[1]

WITH THE REPORT OF ILLUSTRATIVE CASES.

By William G. Spiller, M.D.,
PROFESSOR OF DISEASES OF THE NERVOUS SYSTEM IN THE PHILADELPHIA POLYCLINIC;
ASSOCIATE IN THE WILLIAM PEPPER CLINICAL LABORATORY,
UNIVERSITY OF PENNSYLVANIA.

The relation of migraine to epilepsy is one of much interest, partly on account of the prevalence of both diseases. Two cases which have recently come under my observation seem of sufficient importance to be reported, and offer a modest contribution to our knowledge of the subject:

Case I.—A. A. D., white, aged fifty-one years, a carpenter by trade, was referred to my clinic at the Polyclinic Hospital by Dr. S. Solis-Cohen, and to him I am indebted for the opportunity of studying the case.

Family History. Father died at the age of sixty-one years from "phthisis or spinal disease." Mother is living and well. One brother is living and well. The patient has had no children, but his wife had one miscarriage at the fourth month.

Previous History. The man had measles when a child, but his mother states positively that he had no convulsions in childhood. He denies having had venereal disease. He had "camp fever" in 1864, and was in bed for two weeks. He had some kidney trouble for two or three weeks in 1898, and at present he has to get up at night to pass his urine. His urine, however, is normal; it contains no casts, no albumin, and no sugar. He has used alcohol since he was eight years of age, but says he never drank to excess. He used tobacco to excess both in chewing and smoking, and about thirty years ago he smoked as many as thirty cigars daily; at present he smokes very little.

---

[1] Read before the Philadelphia Neurological Society, October 23, 1899.

Seven years ago he first noticed numbness on the end of his tongue, on the right side, lasting a minute or two. He was unable to speak while this numbness existed, although he knew what he wished to say. The numbness may possibly have extended a little to the left side of the tongue. The attacks of numbness in the tongue were at first very infrequent, occurring only once or twice in a year. He believed they were due to the use of tobacco, and after he stopped chewing tobacco he thought the attacks were not so severe, but they still continued.

Two or three years ago—*i. e.*, four or five years after the attacks of numbness in the tongue began—he noticed the first attack of numbness in the right hand and arm. When he had one of these attacks he could not grasp an object with the fingers of the right hand, and the article slipped from his hand. He had a sensation in the right arm, and especially in the hand, which he described as "pins and needles." The numbness appeared in the right lower limb shortly after it was first noticed in the upper limb. When the hand and leg became affected the numbness was associated with a "drawing feeling," probably a sensation of tension. The numbness would begin in either extremity of the right side or in the face on the right side. At times when it began in the right upper limb it would descend to the right lower limb; at other times it would begin in the right upper limb and pass to the head; at other times it would begin in the right lower limb, pass to the right upper limb, and ascend to the head; but in the attacks in which he fell the numbness always, or nearly always, began in the back of the right hand and passed to the right side of the head; the right eye then *felt* as though it were drawn up and to the right and backward, and the right corner of the mouth upward. When he felt that he was in danger of falling he made grasping movements with his arms, and these, he believes, were made to secure support and prevent himself from falling. A man who observed him in one or two of his attacks says his face and eyes were *not* drawn upward. The patient has lost consciousness in his major attacks, usually after falling, and has remained unconscious about a half to three-quarters of an hour. No relaxation of the sphincters has occurred during an attack. He has not had any jerkings or twitchings, but a tremor of the hands has been observed during a major attack. A glass of water has frequently aborted an attack. When one of his major attacks is coming on he utters a sound like "Uh-uh-uh!" After an attack of unconsciousness is over he gets up and goes to work, although he feels bewildered. In his lighter attacks, lasting not over a minute, he has numbness of the right side, aphasia, and loss of power in the right hand, but is not unconscious. He has had only six major attacks—*i. e.*, attacks with unconsciousness—and all these have occurred within the last two years. In two of these attacks the tongue was injured. He feels so unusually well for twenty minutes or so before one of his major attacks begins that he knows he is about to have an attack, and can tell the approach of an attack by a drowsy feeling. His wife saw him in a severe attack, and she says he came into the room making gestures for her to call the neighbors. He did not speak, and his face seemed puffed out. He permitted himself to be laid on the floor, and soon lost consciousness, but had no convulsions. He has not been a sufferer from headache, nor has he at any time had visual disturbances—hemianopsia, scintillating scotoma, etc. He is seldom dizzy.

His knee-jerks are very active and equal. He has no objective sensory disturbances. His taste is normal. Sense of position in the extremities is normal except that a slight disturbance may exist in the right fingers. No indications of hysteria are detectable. He reads easily, and is not at all deaf to words or sounds. He writes without difficulty.[1]

The report of his ocular condition by Dr. H. F. Hansell is: "Cutting down in the anterior downward portion of the form field. Vision is good. Pupils are equal and react fairly to light and in convergence. The muscles are normal, and the optic nerves show slight effects of eye-strain, which is not of any especial importance."

The second case I was invited to see by Dr. S. M. Hamill:

Case II.—A. B., twenty-one years of age, is a well-developed woman. The mother of the patient had attacks of tingling in both hands, disturbance of speech, with severe bilateral headache, but without visual disturbances, between her eighteenth and twenty-first years. She never had these attacks at any other period of her life. Recently she has had attacks, lasting a half-hour to an hour, in which the person at whom she was looking became indistinct and seemed to have only one eye. No other phenomena were noticed. A maternal aunt of the patient suffered from severe bilateral headache. The mother's family and the father of the patient were gouty, and the patient has indications of a gouty tendency. No history of epilepsy in the family could be obtained.

When four and a half years old A. lost her balance while sliding down the balusters, and fell a distance of about eight or nine feet. She was on her hands and knees, trying to get up, when her mother reached her, and seemed to be confused. She complained of intense pain in the back of the head and neck. A red spot was seen upon the right side of the head, where she struck the floor. In a few minutes after the fall she became unconscious and appeared to be dead. After a short time she began to scream: "Oh, mamma; I am falling!" and this screaming continued for more than two hours. Four hours after the fall she seemed much excited, could not sleep, repeated long stories, but did not complain of pain. The next day and for several successive days her mind was exceedingly active.

Some months after the fall the mother observed an attack in which the right arm fell powerless to the side of the body, and the whole right side seemed paretic for about half an hour. Headache also was complained of. These attacks of transitory paralysis occurred during many years, and some attacks seemed to be aborted by medicine. Sometimes these attacks were on the right side and sometimes on the left side, but they were never on both sides at the same time. As she grew older and became more able to explain her symptoms she complained of numbness and loss of sense of position in the paralyzed limbs, of paraphasia, and intense headache on the side opposite to the affected limbs when she had the attacks of paresis. The pain then was intense, and was in the motor region. The head pain was never on the same side as the weakness of the limbs, although the paresis and headache were first on one side and then on the other. When quite a small child she said she had five different kinds of headache. She was never entirely free from this pain. In her attacks the numbness would begin in the fingers and pass upward, and as it passed upward the part of the limb below nearly always lost all sensation. When the numbness reached the tongue she was unable to speak correctly; she could say words, but they conveyed no meaning. No visual symptoms existed at any time, except that dark spots and lines may have been seen many years ago during some of the attacks, although considerable doubt exists in regard to this. During the past year she complained of dimness of vision, but only in one attack. She is quite certain that she never had hemianopsia or diplopia.

---

[1] After the above was written the patient informed me that he had had an attack of unconsciousness about a week ago while in a railroad train. A fellow-passenger told him that his eyes were drawn up and to the right, that he trembled slightly in all his extremities, and that his upper limbs became flexed and rigid for a short time. This account makes the diagnosis of epilepsy even more probable.

After she was eleven years of age the attacks became much less frequent, and between her fifteenth and eighteenth years they were very rare. No convulsions were ever observed, and as she was under constant observation, and convulsions were feared and watched for, it is probable that they would have been detected if they had occurred. The headache in the motor region sometimes occurred without the numbness of the opposite upper limb, but very seldom, and only when medicine had been administered; the numbness never occurred without the headache except on one occasion during the past year, when a peculiar dead feeling was experienced in both hands. This was the only time that paræsthesia existed in both hands at the same time. The headache, when in the frontal region, was sometimes attended by hallucination of smell; a sweet odor was perceived when none existed, and no numbness was felt at these times.

About three years ago she fell from a wagon and struck her left cheek, just below the eye. The attacks did not immediately become more frequent, but only after a year or two.

On October 4, 1899, about midday, an attack of numbness began in the right upper limb and extended to the face, and she lost the power of correct speech. She took a nap and awoke feeling well. The day before this attack occurred she had spoken of feeling unusually well. Toward night on October 4th she suddenly began to complain of severe pain in her head. She was placed on the floor by her mother. Her father, who is a physician, was called, and reached her a few minutes after the attack commenced. She was quiet, and he thought she was unconscious. She soon began to complain of her head again, and a very small amount of chloroform was administered. After the attack was over she had a very imperfect recollection of what had happened during the attack. Her mother said that in the beginning of the attack the head and eyes were drawn to the right, and she described the attack as a convulsive one. She was possibly excited, and may not have made careful observation.

After the fall from the carriage, about three years ago, a slight lateral curvature was noticed in the lumbar region, and the entire spine is now exceedingly sensitive to slight pressure, and much spontaneous pain is complained of in the back.

In my examination made October 13, 1899, the pupils were equal and reacted to light and in convergence. The patellar reflex was normal. No disturbances of objective sensation existed anywhere. No tender spots were found beneath the breasts, in the inguinal region, or on the head. The grasp of the hands was equal and good.

A urinary examination was made by Dr. S. M. Hamill, October 13, 1899: Reaction, normal; specific gravity, 1010; albumin, none; sugar, none; no pus-cells; no casts; normal epithelium.

Dr. Hamill made a careful examination of the thoracic and abdominal organs. There was no evidence of pulmonary tuberculosis or organic heart disease; a slight systolic whiff was heard just below the pulmonary area, and was believed to be functional, on account of its location and limitation, together with the normal pulmonary sound. The aortic sound was very much accentuated, as a result of high arterial tension. The abdominal examination revealed a freely movable right kidney and apparently a gastroptosis as well as an enteroptosis. The transverse colon was considerably dilated. The spleen and liver were not enlarged

These cases may be briefly summarized: The first patient, a man of fifty-one years, who had used alcohol since his eighth year and smoked to great excess, began, when about forty-four years old, to have numbness in the right side of the tongue and inability to speak; these attacks lasted a minute or two. The attacks occurred at first only once or twice a year, but are now frequent. When about forty-eight years old he began to have similar attacks of numbness in his right upper limb, and after a short time in his right lower limb, these attacks lasting a minute or two. The numbness of the hand was attended with weakness of the part. The paræsthesia has always been confined to the right side of the body, and has been associated with impaired function of the part affected, as shown by loss of speech and the weakness of the hand. These attacks may be regarded as petit mal. He does not lose consciousness in these attacks. The excessive use of alcohol and tobacco may have etiological importance, and may possibly account for the late development of the epilepsy. Erb[1] has stated very positively that excessive use of tobacco causes arterio-sclerosis. The development of the numbness followed a regular course: First the tongue was affected, then the right upper limb, and finally the right lower limb. The major attacks began after the attacks of numbness had existed for some time, and they were preceded by an aura; a feeling of unusually good health, followed by drowsiness. The bewilderment following an attack of unconsciousness, and the cry "Uh-uh-uh" preceding the attack, are suggestive of epilepsy.

The absence of convulsions is a noteworthy feature of the case; but, recognizing the case as one of epilepsy, we are prepared for the appearance of convulsions at any time. Paræsthesia is by no means unknown in epilepsy, either preceding or following a convulsive attack, and we need hardly be surprised that it should exist without the convulsions. The strict limitation of this paræsthesia to the right side of the body is a most interesting fact. The periods of unconsciousness and the paræsthesia beginning in the back of the right hand, when it heralds a major attack, are also noteworthy.

---

[1] Deutsche Zeitschrift für Nervenheilkunde, vol. xiii., Nos. 1 and 2.

I have searched for some indication of word-blindness, of agraphia, of word-deafness, of motor aphasia—inasmuch as the symptoms point to involvement of the left cerebral hemisphere—of hysteria, but none are present. The absence of headache, of scintillating scotoma, makes a diagnosis of migraine doubtful. I should prefer to regard the case as a *forme fruste* of epilepsy—as an example of sensory epilepsy.

The second case is much more like one of migraine. Unilateral headache, with transitory paresis and paræsthesia on the opposite side of the body, with paraphasia, may be called migraine. The commencement of the attacks in early life, after a severe fall upon the head, must arrest attention. This injury seems to have had etiological importance. The mother of the child had peculiar attacks of headache, and a history of gout in the family was obtained. The possible relation of this case to epilepsy is shown by the occurrence of an attack of doubtful interpretation seventeen years after the attacks of paræsthesia and paresis began. The attacks of paresis would afford an interesting theme for some remarks, but paralysis as an epileptic equivalent has been recently ably discussed before this Society by McConnell,[1] and I merely refer to the fact that in my case the attacks were of long duration—a half-hour or so.

We have, therefore, two cases in which attacks of unilateral paræsthesia and paresis occur, associated with disturbance of speech; and in one case with periods of unconsciousness; in the other with severe headache on the opposite side. The headache is a very important symptom, but no less important are transitory paresis, paræsthesia, and disturbance of speech. Paderstein[2] says that hemicrania is the most common symptom of ordinary migraine, but that, according to most authors, the statement "no migraine without hemicrania" is incorrect.

Cases of sensory epilepsy are described in the literature in connection with migraine. Féré, for example, says that epilepsy is among the frequent accompaniments of ophthalmic migraine, especially the partial epilepsy. Ophthalmic migraine may develop in a person who has previously had partial epilepsy and still has attacks of paræsthesia in the side of the body in which the epileptic movements occurred. He gives a good example of this. He speaks also of other forms—of cases in which the migraine may precede the epilepsy, of cases in which the two conditions occur together, and of cases in which the attacks of migraine become less severe after the appearance of partial epilepsy. The cases reported by Féré[1] are very instructive.

---

[1] Journal of Nervous and Mental Disease, June, 1899, p. 355.

[2] Paderstein. Deutsche Zeitschrift für Nervenheilkunde, vol. xv., Nos. 5 and 6, p. 332.

Charcot also was much interested in ophthalmic migraine, and a case published by him is well worthy of attention. A man had attacks of a peculiar character, which began generally about six o'clock in the evening with right lateral hemiopia and scintillating scotoma. This period lasted about an hour; the hemiopia and scotoma disappeared, and were followed by left-sided headache and aphasia for all forms of speech—*i. e.*, word-deafness, word-blindness, motor aphasia, and agraphia. The second period also lasted about an hour, and then paræsthesia of the right hand and upper and lower lips developed; the headache increased and nausea became pronounced; finally, the patient fell asleep, and the attack was over. No history of convulsions is given. Charcot[2] remarked that paræsthesia of the limbs and face and aphasia very rarely occur in migraine; but he also stated that ophthalmic migraine may be associated with transitory hemiplegia, epileptoid attacks, and other phenomena.

The severe forms of ophthalmic migraine may be regarded as " associated with " epilepsy, if one so pleases; but when epilepsy occurs with migraine it is well to recognize that there is probably some connection between the two diseases, and that it is not merely a chance occurrence of two diseases in the same person. The important fact is that a person who has ophthalmic migraine, with aphasia and unilateral paræsthesia, may some day develop Jacksonian convulsive attacks. Whether this is to be regarded as epilepsy associated with migraine, or the whole is to be considered an epileptic manifestation, can be determined only after we understand better the pathology of the two diseases. It may be that ophthalmic migraine and epilepsy have the same cause in some cases; it may be that the migraine changes the structure of the cerebral vessels and of the brain and renders the latter liable to the epileptic disease. In my first case no history of headache or visual symptoms could be obtained; it would seem improper to regard these attacks of paræsthesia and paresis from which the patient suffered as a *forme fruste* of ophthalmic migraine. It seems better to look upon them as a *forme fruste* of epilepsy.

Diller[3] presented to this Society in 1895 a case which, in many of its features, closely resembles my first case. He described it as a case of sensory epilepsy. The patient, a man, twenty-five years old, was kicked by a mule on the right side of the forehead, and was unable to work for about a week. About a year and a half later he had his first attack. He experienced a feeling of numbness and tingling in the left toes—a sensation he described as "pins and needles." This paræsthesia slowly ascended the leg, thigh, and trunk, went down the left arm to the fingers, then up the left side of the neck and face, and involved the left side of the tongue. When the paræsthesia had reached the middle of the trunk in its upward march it began to fade from the toes, and precisely as it had come it passed away. An absolute loss of muscular power passed over and faded from the left side, just as the paræsthesia had done. The attack lasted from twenty to thirty minutes. He was entirely conscious during the attack. Subsequent attacks were similar, and nearly half of them began in the left fingers. When about twenty-eight years old he had a general convulsion, which began with the manifestations of the sensory attacks, and in this attack he lost consciousness. These sensory attacks lasted about a year and a half before a convulsive attack occurred.

---

[1] Les epilepsies et les epileptiques, p. 50.

[2] Nouvelle iconographie de la Salpêtrière, 1895, No. 1, p. 3.

[3] Journal of Nervous and Mental Disease, 1895, p. 284.

Diller thought that the theory of an irritated sensory cortex was hardly acceptable, because the paræsthesia did not always begin in the same part, although he stated that a brain tumor might have been present.

Möbius speaks of the difficulty attending the diagnosis of epileptic migraine. He refers to the fact that Féré regarded epilepsy and migraine as expressions of the same disease, and quotes this sentence from Féré's writings: "Among the phenomena accompanying partial epilepsy or alternating with it, it is necessary to mention sensorial migraine, and especially ophthalmic migraine, which may serve as a type, and which, when isolated, constitutes a veritable sensorial epilepsy, with phenomena of exhaustion, hemianopsia, and sometimes somnolence." Möbius goes on to say that from this stand-point there can be no difference between migraine and epilepsy, and he thinks Féré makes a mistake in basing his opinion merely on the symptoms. Migraine, according to Möbius, is an hereditary disease, unaltered in its manifestations by transmission—which, however, is not always true. It usually remains without change during the life of the patient; it does not cause mental enfeeblement, and, therefore, it is different from epilepsy. He acknowledges, however, that in certain cases it may be impossible to say whether epilepsy or migraine is present; but when convulsions appear the disease is to be regarded as epilepsy with migrainoid symptoms. The symptoms of migraine are of a sensory character, and he would not diagnosticate a case as one of migraine when convulsive movements are present, even though they are as slight as the drawing of the mouth and tongue to one side. The phenomena accompanying the convulsions are to be regarded as simulating migraine, but the case is one of larvated epilepsy. Möbius quotes three cases reported by Féré as cases of ophthalmic migraine, and states his (Möbius[1]) opinion that they should be classed under epilepsy. This is an instance of how two distinguished neurologists may disagree in the names to be employed in diagnosticating between epilepsy and migraine. Möbius also says that if a patient with migraine has attacks of unconsciousness the suspicion of epilepsy may be entertained. Surely, attacks of unconsciousness without migraine, as in my first case, are no less suspicious of epilepsy. The difficulties in making a distinction between certain forms of epilepsy and migraine are clearly presented in Möbius' words, and his work is one of the best that have appeared on the subject of migraine.

The heredity in migraine is usually direct, but it may occasionally be indirect. Gowers[2] refers to a woman, aged forty-six years, who had migraine for many years (paroxysmal headaches, with dimness of sight and vomiting); one of her children was epileptic, and her mother had been epileptic and insane. He had also a brother and sister as patients; one suffered from epilepsy, the other from migraine. Gowers speaks of the relation between migraine and epilepsy, and says he has seen cases in which epilepsy succeeded migraine, and the epileptic fits seemed, as it were, to grow out of the attacks of migraine.[3]

Oppenheim[4] observed a case in which attacks of hemiparesis intercurred with the migraine attacks; in my second case the hemiparesis and the hemicrania occurred simultaneously.

In view of the abortive forms of epilepsy which occasionally appear, it may be well to repeat the definition of epilepsy given by one of the most recent writers on this subject—Binswanger,[5] in the Nothnagel series of monographs. "Epilepsy," he says, "is a very chronic disease of the central nervous system, and is produced by the most different causes. Its clinical phenomena exist in repeatedly occurring convulsive attacks, with unconsciousness, or in partial manifestations of these attacks, or in psycopathic attending or following phenomena."

A still more recent definition is given by Donath.[6] According to him, epilepsy is a morbid excitement of the cerebral cortex, increasing suddenly, returning periodically, having a typical course, and diminishing rapidly. Whether the attacks occur with unconsciousness and amnesia or not depends on the severity and extent of the irritation. Unconsciousness and amnesia are not a necessary part of the attack.

It is not my intention to give the opinions of all the writers regarding the relation of epilepsy to migraine; they may be found in the various text-books. A proper view of the subject seems to me to be the following:

---

[1] Die Migräne, p. 76, Nothnagel's Specielle Pathologie und Therapie.

[2] A Manual of Diseases of the Nervous System, vol. ii., second English edition.

[3] Loc. cit., p. 849.

[4] Lehrbuch des Nervenkrankheiten, first edition, p. 720.

[5] Die Epilepsie. Nothnagel's Specielle Pathologie und Therapie.

[6] Donath. Archiv für Psychiatrie, vol. xxxii., No. 2, p. 339.

1. Attacks of migraine occur associated with nausea and vomiting; this form is known as simple migraine, and usually remains unaltered during the life of the patient.

2. In other cases visual disturbances (hemianopsia, scintillating scotoma, amaurosis, etc.) are associated with the migraine, and the disease is then known as ophthalmic migraine.

3. When paralysis of the ocular muscles occurs with the migraine the disease is described as ophthalmoplegic migraine.

4. Migraine, especially the ophthalmic form, is related to epilepsy, and the attacks of migraine may precede for many years the convulsive attacks of epilepsy, although in most cases of migraine no convulsions are ever detected.

5. In some cases epilepsy appears in the form of one or more of the disturbances seen occasionally with migraine, and later, even after many years, convulsions develop. The disease may be epilepsy from the beginning. It matters little, with our uncertain knowledge of the pathology of the two diseases, whether we regard these as abortive cases (*formes frustes*) of migraine that later become associated with epilepsy, or as abortive forms of epilepsy (sensory epilepsy), in which the convulsions later become apparent, provided we recognize a relation between some forms of migraine and epilepsy.

FACIAL SPASM AND ITS RELATION TO ERRORS OF REFRACTION.[1]

By E. W. Stevens, M.D.,
OF DENVER, COLO.

Under the general designations "facial spasm," "mimic spasm," "habit spasm," "histrionic spasm," "painless tic," "convulsive tic," and "palmus" are included several groups of cases presenting the common clinical feature of spasm of the muscles supplied by the seventh or facial nerve.

The following groups of cases are recognized by Osler:[2]

1. The secondary form following paralysis, and consisting in spontaneous clonic twitchings recurring at irregular intervals in the paralyzed muscles.

2. Cases due to the irritation of an organic brain lesion either of the cortex or of pressure on the facial nerve from an aneurism or tumor.

3. In many cases no cause can be assigned—the idiopathic form of Gowers.

---

[1] Read before the Colorado State Medical Society, June 20, 1899.

[2] American Text-book of the Theory and Practice of Medicine, vol. i. p. 832.

4. Cases which appear to have a reflex origin and which are associated with irritation in branches of the fifth nerve, as in eye-strain, nasal affections, and diseased teeth. This form of spasm is frequently found in children, and while it may be limited to the facial muscles, is also met with in other groups of muscles. This form of spasm has been called "habit spasm" by Gowers[1] and "habit chorea" by S. Weir Mitchell.[2]

Lastly, facial spasm may form a part of the affection described by the French as Gilles de la Tourette's disease, which is characterized by involuntary spasmodic jerkings in certain muscle groups, particularly those of the face, the explosive utterances of obscene words, and fixed ideas.

The symptom-picture differs but little in all forms of facial spasm. The patient has lost control over some of his facial muscles either on one side or both. The spasm is, as a rule, unilateral at first, and may continue throughout to be unilateral, or may become bilateral after a number of years. They are usually of a rapid, electric-like character. There are often a series of quick, quivering contractions. The spasm is usually clonic. If there is tonic spasm there is almost always clonic spasm as well. In the most common form, the idiopathic, the spasm usually attacks one or two muscles at first, and these at infrequent intervals. The patient or his friends may observe a slight twitching of the orbicularis palpebrarum or of the levator anguli oris. These twitchings become more pronounced, occur more frequently, and may spread to neighboring groups of muscles, and after a time a marked admixture of tonic and clonic spasms is usually observed. Voluntary motion in the muscles is perfectly normal, except for the disturbing influence of the spasms. All sensory disturbances are also wanting. There is neither anæsthesia nor pain. At the beginning the muscles most frequently affected are the orbicularis palpebrarum and the zygomatics. Blepharospasm is a spasm—usually clonic—of the orbicularis palpebrarum muscles, manifesting itself usually by an uncontrollable winking or blinking of the eyelids, the so-called nictitating spasm. A more serious and uncomfortable phase of the difficulty is cramp of the entire muscle when the eyelids are closed tightly and violently, so as to be painful to the patient. In the latter tonic type the lids may remain tightly shut for some minutes, days, or even months, and the patient rendered practically blind from inability to use his eyes. Blindness has occasionally resulted in these cases.

Blepharospasm may be caused by an inverted eyelash, a foreign body producing peripheral irritation, or a corneal ulcer; but we are considering here only that form for which no cause can be found in the condition of the eye or its coverings The most intractable cases of facial spasm are of this type. Blepharospasm may be due to irritation of the ophthalmic branch of the fifth nerve, owing to conjunctivitis, refractive errors, and muscular insufficiencies. Often the irritation is reflected from the nose, the teeth, or the pharynx. Dr. Pershing[1] has recorded a case in which he attributed the cause of blepharospasm to prolonged tension of the nervous system. Some cases are of central or even cortical origin. A lesion, however, would have to be very small indeed so to affect the cortex or subcortex as to cause blepharospasm without affecting any other muscles of the face. The so-called functional cases of blepharospasm often obstinately resist treatment. They may be temporarily relieved by pressure upon the branches of the fifth nerve, which come from the orbit, or upon the branches of the facial, which supply the muscles affected. Sometimes these pressure points, which were first carefully described by von Graefe, are found on the vertebral column.

---

[1] Diseases of the Nervous System, 2d edition, vol. ii. p, 633.

[2] Lectures on Diseases of the Nervous System, Lecture VIII.

Facial spasm is usually strictly confined to the distribution of the facial nerve, but occasionally muscles supplied by other nerves may be affected, showing that the spasms are due to some widely distributed organic lesion, affecting, it may be, the trigeminus, vagus, or other nerves.

Spasms of the muscles supplied by the motor division of the trigeminus may exist independently of the facial—the masticatory spasm of Romberg—and may be either tonic or clonic. Cases of clonic masticatory spasm are seen in which the spasmodic movements are frequently repeated, causing a disorder sometimes spoken of as "chattering jaw." The chattering is almost continuous, except when the patient is asleep. It is usually a sign of senility. Trismus, in its narrowest sense, is a tonic spasm of the muscles supplied by the motor branch of the trigeminus, and especially of the masseters, in consequence of which the jaws are held tightly closed.

In neuralgia of the fifth nerve, or tic douloureux, reflex spasm may occur in some of the facial muscles; but we are dealing in this paper with only the painless forms of spasms.

Children frequently, and adults sometimes, present spasmodic movements that have a half-voluntary aspect, but which the patients are unable to control. An eye may be rapidly winked, or the eyeball rolled rapidly upward, or the brow wrinkled, or the facial muscles contorted, or it may be the shoulder is shrugged or a forward movement of the head or jaw is made. A peculiar fidgety movement of the head or arm is common; more rarely leg movements occur. In other cases the respiratory muscles are involved and various disordered sounds are emitted by the patient. This group of symptoms has been described by S. Weir Mitchell[1] under the term "habit chorea." Gowers,[2] however, considers the name a misnomer, and, believing the affection to be a form of spasm or tic, has given it the name of "habit spasm." This affection usually begins between the ages of six and fourteen years. Rarely it begins late in life, and is then generally permanent. When it commences in childhood the spasms usually cease after a few months or a few years. In adults in whom the disorder has lasted for some time it is difficult, if not impossible, to arrest the movements.

---

[1] American Medico-Surgical Bulletin, June, 1895.

Often habit spasm arises from nasal diseases or diseases of the rhinopharynx. In the greatest number of cases, however, some ocular defect, as an error of refraction or insufficiency of the muscles, is responsible for the affection, as has been well shown by Wharton Sinkler[3] and G. E. de Schweinitz.[4]

The etiology of facial spasm is often most obscure, the most common type being separated into a class called idiopathic. The origin of the disease is cleared up during the life of the patient only if, after the removal of some primary cause, the spasms cease. Many cases are undoubtedly of reflex origin, and especially irritation of the fifth nerve, to which the facial has a special reflex relation.

Hirt[6] reports a case of blepharospasm, which had persisted for years and was considered hopeless, which was cured after a flexion of the uterus had been improved. Bettremieu[6] has recorded three cases of facial spasm due to irritation of the filaments of the fifth nerve in the lachrymo-nasal canal.

Many cases of cortical spasm have been recorded. One of the earliest and most remarkable of these is the case recorded by Berkley and quoted by Mills. In this case the spasm was confined to the zygomatics of the left side of the face. On autopsy a nodule of calcareous degeneration was found in the precentral convolution of the right side, about one and a half inch above the Sylvian fissure.

Facial spasm is frequently the signal symptom in cortical or subcortical disease. It may be produced by a small, gross lesion anywhere from the facial muscles to the peripheral distribution of the nerve. Cases have been reported in which tumors, aneurisms, or foci of softening or degeneration have produced facial spasm. According to Mills,[7] in all these cases due to coarse lesion, whether cortical, subcortical, nuclear, or neural, the spasm is coarser and more irregular in type than in other cases.

---

[1] Loc. cit.

[2] Loc. cit.

[3] The American Journal of the Medical Sciences, May, 1897.

[4] Proceedings of Philadelphia County Medical Society, 1888, p. 144.

[5] Diseases of the Nervous System, Hock's trans., p. 81.

[6] Archives d'Ophthalmologie, April, 1899, p. 246.

[7] The Nervous System and its Diseases, p. 922.

A number of cases of facial spasm have come under my observation in the past few years. In some of these cases an examination and treatment of the eyes proved of distinct advantage to the patient; in others the results were negative so far as influencing the spasms was concerned.

Case I.—F. E., aged twenty-two years; occupation, barber. General health good. No history of rheumatism or chorea. For the past ten months had complained of eyes closing and shutting rapidly, with a quick, snapping movement, which had compelled him to abandon his occupation. No other muscles affected. An examination of his eyes gave the following results: O. D., 4/6; O. S., 4/6. Esophoria, 7 centrads. The external anterior segments of the eyes were normal, and there were no notable changes in the fundus. There was distinct dread of light. Atropine was ordered and continued for about a week. Under this mydriatic the refraction was found to be O. D. + 0.50 S. = 1.00 C. ax. 60°. O. S. + 1.50 C. ax. 120°.

These glasses were ordered for constant wear. Constitutional treatment was given in the form of Fowler's solution of arsenic in ascending doses. In four months the blepharospasm had entirely disappeared.

Case II.—A. B., aged forty-four years, a carpenter by occupation, applied for treatment at Dr. Edward Jackson's service at the Wills Eye Hospital, Philadelphia. This patient was of fine physical development, with no personal or family nervous history. For the past ten years had had severe bilateral blepharospasm of the clonico-tonic type. For several years had been unable to attend to work on account of the violence of the twitchings. This case had been under the care of several competent ophthalmologists and neurologists, and had taken long courses of arsenic, galvanism, and antispasmodic remedies, without avail. Both facial nerves had been stretched, with recurrence of spasms in a few months. The examination of his eyes gave the following results: O. D., 4/8; O. S., 4/8. The conjunctiva was injected, but not catarrhal. Small oval disks, with retinal striations above and below. Under duboisine the refraction was found to be O. D. + 1.00 S. = + 1.50 C. ax. 90°. O. S. + 1.50 S. = + 1.00 C. ax. 90°

The full correction was ordered, but no improvement had followed when the patient removed from the city, a couple of months later.

Case III.—Mrs. Mary G., aged forty years; in fair general health. When twenty-four years of age she first noticed twitching of the lids of both eyes, which has slowly grown worse, in spite of treatment. For years she has been unable to read or use her eyes for near work. She now presented violent clonic, bilateral blepharospasm, with involvement of the zygomatics. The eyes were as follows: O. D. and O. S., 4/4; amplitude of accommodation, 4 D.; esophoria, 3 centrads. Anterior segments and fundi normal in all respects, and under atropine mydriasis the patient was found to be wearing the right correction, + 1.00 D. in each eye.

Both facial nerves were now stretched under ether, and the stretching was repeated two days later, as very little influence had been produced upon the spasms by the first operation. The second vigorous stretching caused facial paralysis, with, of course, entire cessation of the spasms. Unfortunately, with the return of voluntary power in the muscles in six weeks, the spasms also returned with their former force and frequency.

Case IV.—Miss B. S., aged seventeen years, a remarkably healthy-looking, well-nourished girl This patient was of a highly excitable, nervous temperament, inherited from her father. For the past six months she had suffered from rapid blinking and shutting of her eyes, jerkings of her head, and at times twitchings of her arms and legs During this period she was under the professional care of a well-known neurologist.

An examination of the eyes had been made, but owing to the lack of control of the patient it was regarded as imperfect and unsatisfactory. My examination yielded the following results: O. D., 4/30; O. S., 4/20. Lids, lashes, and conjunctiva were normal and cornea clear. It was beyond my power to test the muscle balance or obtain a satisfactory study of the fundus oculi, on account of the jerkings of the patient and the marked dread of light.

Atropine mydriasis was produced and kept up about ten days. Under this the refraction by the shadow-test was found to be O. D. — 1.00 S. = — 2.00 Cyl. ax. 30°. O. S. = — 1.50 — 1.50 Cyl. ax. 180°. A full correction was ordered, and arsenic was once more given in ascending doses. One month after the spasms had nearly subsided, and at the end of two months they had entirely ceased. There had been no return of spasms two years after, when I last saw her.

Case V.—Mrs. H. R. H., aged thirty-six years, referred to me by Dr. Jameson, of Philadelphia. This patient was a finely developed woman in perfect health. Ten years ago she first noticed twitchings of the lids of the left eye, which after a few months were accompanied by twitchings of the muscles of the face on the same side, and gradually grew worse. During this time she had consulted many of the most eminent neurologists, both in this country and abroad, being for several months under the care of the late Prof. Charcot. Strange to record, during all this treatment by electricity, arsenic, and antispasmodics her eyes had never been examined. The examination of her eyes now showed that they were normal in all respects with the exception of a refractive error of + 0.50 D. in each eye. These glasses were ordered for all near work, but, as was expected, without the slightest influence upon the force or frequency of the spasms.

Case VI.—Alice C., aged eight years. For the past two months had had persistent spasmodic bilateral winking, compelling her withdrawal from school. No history of rheumatism; no twitchings of the muscles of the face or jerkings of the limbs or head The eye examination was as follows: O. D. and O. S., 4/6. Muscle balance not taken. Refraction under atropine gave O. D. + 1.00 Cyl ax 90°. A S + 1.00 Cyl. ax. 90°. This was ordered for constant wear, and arsenic given in increasing doses. Six weeks later the winking was entirely cured.

These cases illustrate the importance, in the treatment of facial spasm, of fully correcting the error of refraction in conjunction with proper internal medication. It is essential in every case to determine the existence of the cause and remove it.

It is not my intention to attribute to errors of refraction an undue importance as exciting agents in the causation of facial spasm A large number of cases may be strictly traced to diseases of the pharynx and nasal diseases, as has been pointed out by Jacobi,[1] and in a still larger group no cause can be assigned.

I wish to emphasize the following points:

1. The refraction and muscle balance should be carefully examined.
2. The refraction should be determined under complete mydriasis and the full correction ordered.
3 It is not sufficient to get rid of the cause, for the nerve-centres, having acquired a vicious habit, do not recover their normal condition until systematic treatment has been pursued.

CYSTINURIA AND ITS RELATION TO DIAMINURIA.

By Charles E. Simon, M.D.,
of Baltimore, Md.

Cystin, which was first discovered by Wollaston in 1805, in a vesical calculus obtained from a child five years of age, is seen only in the urine under conditions which are essentially pathological in their nature. It may occur in solution or as a simple deposit, and thus be eliminated without giving rise to any disturbance. More commonly, however, concretions are formed in the kidneys or bladder, leading to attacks of renal colic and to symptoms of vesical irritation. It has been argued that as these cases only are seen by the physician, cystinuria may be much more common than is generally supposed, and this is no doubt true to a certain extent; but if we remember the care with which the urine of practically every patient is examined at so many of the leading hospitals of the world, and compare with the total number of such examinations the actual number of cases of cystinuria recorded in the literature, it is apparent that the condition is nevertheless one of great rarity.

During the last ten years I have examined not less than fifteen thousand specimens of urine, and the case of cystinuria presently to be described is the only one that has come under my immediate observation. At the Johns Hopkins Hospital and Dispensary only three cases have been seen during the same period of time.

The first case of cystinuria, as I have already indicated, was described by Wollaston, who recorded his discovery, together with the history of a second case, in 1810. Niemann, in his excellent monograph, published in 1876, gives an account of fifty-two cases which he has collected from the literature, and adds a further case. I have arranged these in chronological order in the table below, and have attempted to complete the list to the present time.

---

[1] The American Journal of the Medical Sciences, 1896.

No.	Observer.	Age.	Sex.	Publication.
1	Wollaston	5	Male	Philos. Trans. London, 1810, p. 223.
2	“	36	“	Ibid.
3	Magendie	20	“	Recherch. Phys. et Med. sur les causes de la gravelle, 2d ed., Paris, 1818. p. 124.
4	Marcet	30	“	Essay on the Chem. Hist and Med. Treat. of Calculous Disorders, 2d ed., London, 1819.
5	“	30	Brothers	Ibid.
6	“	30–49		
7	Brande	...	Male	Quart. Journ. of Science, Literature, and Arts, London, 1820, vol. viii. p. 71.
8	“	40	“	Ibid.
9	Stromeyer	...	“	Annals of Philosophy, new series, 1824, vol. viii. p. 146.
10	Prout	30	“	About 1824. Nature and Treatment of Stomach and Urinary Affections, 3d ed., London, 1840.
11	Buchner	...	“	Buchner's Reporter, 1825, vol. xxi. p. 113.
12	Yelloly	4	“	Philos. Trans. Royal Soc. of London, 1829, p. 30.
13	Venables	47	Female	Quart. Journ. of Science, Literature, and Arts, new series, 1830, p. 30.
14	Neill	50	“	Lancet, 1831.
15	Bley	...	Male	Buchner's Reporter, 1835, vol. lvii. p. 165.
16	Willis	Child	...	Urinary Diseases and their Treatment, London, 1838, p. 109.
17	Ségalas	15	Female	Essay sur la gravelle et la pierre, 2d ed., 1839, p. 85.
18	Prout	12	Male	About 1836. Nature and Treatment of Urinary and Stomach Affections, 1840.
19	Civiale	25	“	Ueber die med. Behandlung des Steins. Deutsch von Hollstein. Berlin, 1840, p. 446.
20	“	23	“	Ibid.
21	“	39	Brothers	Ibid.
22	“	37		
23	Lenoir	...	Male	Cit. by Civiale, p. 452.
24	“	...	“	Ibid.
25	Schweig	26	“	Med. Annalen, Heidelberg, 1848, p. 364.
26	Hodann-Müller	5	“	Günsburg's Zeitsch., 1851, vol. ii. p. 264.
27	Toël	...	Mother of 28 & 29	Annal. der Chemie und Pharm., 1855, p. 247
28	“	28	Sisters	Ibid.
29	“	30		
30	Schossberger	...	...	Würtemberg. Correspond., 1857, vol xxii.
31	Roberts	21	Female	Med. Times and Gaz., 1858.
32	Heller	18	“	Harnconcretionen, Wien, 1860, pp. 67 and 154.
33	“	43	Male	Ibid.
34	Golding Bird	Boy	“	Urinary Deposits, Amer. ed. Blanchard & Lea, 1859, p. 174.
35	“ “	Child	...	Ibid.
36	“ “	...	...	Ibid., p. 178.
37	“ “	...	Sisters	Ibid.
38	“ “	...		
39	“ “	...	Female	Ibid.
40	d'Etiolles	...	“	Bull. de la Soc. Anat. de Paris, 1862, p. 331
41	“	...	“	Ibid.
42	“	...	“	Ibid.
43	“	...	“	Ibid.
44	“	...	“	Ibid.
45	Bartel	40	Male	Virchow's Arch , 1863, vol. xxvi. p. 149
46	Bary	23	“	Beale, Urine, Urinary Deposits and Calculi, 2d ed., London, 1864, p. 354.
47	Johnson	...	“	Ibid.
48	Marowsky	44	“	Deutsch. Arch. für klin. Med., 1868, vol. iv. p. 449
49	Ivanchich	49	“	Wien. med. Wochensch., 1869
50	Ultzmann	24	“	Ibid., 1871.
51	“	2	“	Ibid.
52	“	7	“	Ibid.
53	“	35	“	Ibid.
54	Müller	30	“	Ebstein, Arch. für Pharm., 1872, vol. li. p. 308.
55	Heath	28	“	Brit. Med. Journ., 1875, Proc London Path. Soc.
56	Ebstein	18	“	Götting. med. Poliklinik, 1875. Rep. in detail by Niemann, Deut. Arch. für klin. Med., 1876, p. 232.
57	Harnier	...	Brothers	Neubauer und Vogel, Analyse des Harns, 1876, 7th ed., p. 336.
58	“	...		Ibid.
59	Sotham	57	Male	Brit. Med. Journ., 1876, vol. ii. p. 817.
60	Guyot	24	“	Progrès Medical, 1878, p. 184.
61	Löbisch	...	“	Liebig's Annalen, vol. clxxxii. p. 231.
62	Ebstein	25	Brothers	Deutsch. Arch. für klin. Med., 1879, vol. xxiii. p. 138.
63	“	...		Ibid.
64	“	23	Female	Ibid.
65	Whitney	31	“	Boston Med. and Surg. Journ., 1879, p. 23
66	Wood	29	“	Ibid., p. 4.
67	“	30	Male	Ibid.

No.	Observer.	Age.	Sex.	Publication.
68	Macphail	...	...	Brit. Med. Journ., 1881, vol. i. p. 968. Proc. of Glasgow Path. and Clin. Soc.
69	Finlayson	Child	...	Ibid.
70	"	Child's brother	Male	Ibid.
71	Ebstein	40	"	Deutsch. Arch. für klin. Med., 1881, vol. xxx. p. 594.
72	Cantani	51	"	Cited by Ebstein (v. s.) from Cantani's Path. und Therap., der Stoffwechselerkrank., vol. iii. p. 17.
73	Czapek	58	"	Prager med. Wochensch., 1881, p. 544.
74	Roberts	57	"	Urinary and Renal Diseases, 4th ed. Lea Bros., 1885.
75	"	...	Female	Ibid., p. 111.
76	Stadthagen	13	Male	Virchow's Arch., 1885, vol. c.
77	Matrai	28	Femal	Pester med. und chir. Presse, 1886.
78	Udranszky-Baumann	...	...	Zeitsch. für physiol. Chemie, 1889, vol. xiii. p. 562.
79	Stadthagen-Brieger	41	Female	Berlin. klin. Wochensch., 1889.
80	Stadthagen-Brieger	...	...	Ibid.
81	Leo	41	Female	Zeitsch. für klin. Med., 1889, vol. xvi. p. 325.
82	Picchini-Conti	29	"	La Sperimentale, cit. in Centralbl. für innere Med., 1892, p. 429.
83	Hall	32	Male	Quart. Med. Journ., 1894, p. 26.
84	Pfeiffer	30	Female	Centralbl. für die Krankheiten der Harn und Sexual-organe, 1894, p. 187.
85	"	...	Brother of 84	Ibid.
86	"	19	Sister of 84	Ibid.
87	"	15	Brother of 84	Ibid.
88	Chabrié	...	...	Annales des malad. des organes genito-urinaires, 1895.
89	Pfeiffer	44	Male	Centralbl. für die Krankheit. d. Harn und Sexualorgane, 1897, p. 173.
90	"	16	Son of 89	Ibid.
91	Smith	8	Male	Practitioner, 1898, vol. i. p. 475.
92	"	52	Female	Ibid.
93	Thorndike-Ogden	33	Male	Boston Med. and Surg. Journ., 1898.
94	Moreigne	29	Female	Arch. de Med. exper. et d'Anat. Pathol., first series, 1899, vol. xi. p. 254.
95	Cohn	7	"	Berlin. klin. Wochensch., 1899, p. 503.
96	"	10	Twins	Ibid.
97	"	10		
98	"	Child	...	Ibid.
99	"	Child	...	Ibid.
100	"	Child	...	Ibid.
101	"	...	Mother of 95–100	Ibid.
102	Himmelstjerna	...	Female	Berlin. klin. Wochensch., 1899, p. 446. Proc. of Congress d. deutsch. Gesellsch. f. Chirurgie.
103	Swarsensky	...	Male	Deutsch. med. Wochensch., 1899, p. 125. Proc. of Berlin. med. Gesellsch.

The total number of cases of cystinuria recorded to the present time is thus 103. To this list I am able to add four additional cases, three of which occurred at the Johns Hopkins Hospital, while the fourth was referred to me for examination by my friend, Dr. S. P. Latané, of Baltimore. In one of the Hopkins cases the urine of the different members of the patient's family was examined for cystin. The results were negative. In one, however, a distinct sulphur reaction was obtained. All three were males; one a negro. In one a vesical calculus existed, which was removed by operation. In the other case a history of rheumatic pains in the region of the right kidney was obtained. An examination for diamines was not made in any one of these cases.

My own case occurred in the person of a young man who was run down by a train, and came under Dr. Latané's observation, suffering from a fracture of the right tibia. The patient's antecedent history was negative. Symptoms of calculus did not exist. Of interest is the fact that bony union was delayed far beyond the usual time. The presence of cystin was incidentally discovered. The urine of the patient's relatives could unfortunately not be examined.

Through Dr. Latané's kindness I was able to observe the excretions of this patient during a period of several months.

The urine was uniformly of a pale yellow color, with a distinct greenish tint, cloudy, and deposited an abundant, white, granular-looking sediment on standing. The reaction was usually alkaline, sometimes neutral, but never acid. The amount varied between 670 and 1750 c.c. in the twenty-four hours. The specific gravity was from 1013 to 1023. Sugar, albumin, and bile-pigments were absent. The indican reaction was rather below normal; the conjugate sulphates were diminished.

The sediment contained large numbers of triple phosphate crystals, a moderate number of leucocytes and epithelial cells, but no casts or red blood-corpuscles. Cystin crystals presenting the characteristic hexagonal form were at times found directly in the sediment; more frequently, however, they only appeared on standing, after the addition of glacial acetic acid or while the urine was undergoing ammoniacal decomposition. The largest amount which could thus be obtained weighed 0.5 gramme. A distinct sulphur reaction was obtained on every occasion, and was at times most intense. Free sulphuretted hydrogen was observed on several occasions.

If we except the first examination, cadaverin was uniformly present in the urine, though in varying amounts. As a general rule traces only were found, but on one occasion as much as 1.6 gramme of the benzoylated compound was obtained. Putrescin was absent. In the feces I was likewise unable to find putrescin, while cadaverin was present in small quantities.

An analysis of these 107 cases shows that cystinuria is apparently more common among males—67.39 per cent.—than among females—32.60 per cent.—but this may be owing to the fact that the formation of concretions in the latter sex is less apt to give rise to disturbances which are serious enough to lead the patient to seek a physician's advice.

Cases of congenital cystinuria have thus far not been observed, although Ultzmann's case (No. 51.), which occurred in a child, two years of age, and in which the bladder symptoms appeared as early as the end of the first year, would tend to show that a congenital form of cystinuria does not lie beyond the domain of possibility.

The age at which the disease is likely to cause more serious disturbances is very variable, and in the great majority of instances the cystinuria has persisted for many years previously. In one of Civiale's cases at least one attack of renal colic, followed by the elimination of a cystin calculus, had thus occurred for fourteen years before the patient was seen. One of Brande's patients, a gentleman of forty years, had passed cystin stones, varying from the size of a pin's-head to that of a pea, for thirty years, and had suffered from pains in the loins since his sixth or seventh year. The patient of Ivanchich, aged forty-nine years, suffered from attacks of renal colic since his twentieth year.

While the disease thus begins quite early in life, it is interesting to note that only three cases (Nos. 59, 73, and 93) are recorded in which the patients had passed the fiftieth year; and it is quite likely, as Niemann suggests, that the existence of the disease eventually tends to shorten life, in consequence of the mechanical disturbances to which it may give rise. Whether or not those rare instances in which the cystinuria is apparently of a transitory character only constitute an exception to this rule is difficult to decide at the present time. Such instances have been recorded by Ebstein and others.

The character of the occupation of the individual does not seem to play a part in the causation of the disease, as is apparent from the fact that among the sixty-three cases in which the age of the patient has been noted the cystinuria had in 12.7 per cent. begun in early childhood already.

The character of the diet also appears to be without influence.

The general health of the patients is by some held to be of no significance from an etiological stand-point, while others have attempted to associate scrofulosis, chlorosis, anæmia, rheumatism, and obesity with its existence. Salisbury (THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, vol. cviii. p. 359) thus even speaks of a cystic form of rheumatism, and Moreigne attaches a considerable amount of importance to the existence of obesity in his case. However this may be, so much is certain, that in the great majority of cases the nutrition of the patients is below par, and I hope to show that this is possibly of greater significance than is generally supposed.

Especially interesting is the tendency of the disease to occur in families. Marcet mentions two brothers (Nos. 5 and 6) who suffered from cystinuria; Civiale likewise reports two brothers (Nos. 21 and 22); so also Harnier (Nos. 57 and 58), Ebstein (Nos. 62 and 63), and Pfeiffer (Nos. 85 and 87). Toël, Golding Bird, and Pfeiffer cite sisters (Nos. 28 and 29, 37 and 38, and 84 and 86, respectively), and Cohn reports a family in which the mother and six children were affected. Pfeiffer further reports a father and his son (Nos. 89 and 90), and Toël states that the mother of his sisters also passed cystin.

So far as I have been able to ascertain, these are the only cases of cystinuria occurring in families that have been recorded in the literature, and it is quite likely that the number would be much larger had attention been directed to this special phase in every instance. It will be observed, however, that even so the percentage is quite large—26.1.

Concerning the mode of formation of cystin in the human body but little is known that is definite, notwithstanding the vast amount of work that has been done in this direction. This is largely owing to the fact that the synthesis of cystin has not as yet been accomplished. Outside of the human body it has only been found in two instances—namely, by Cloëtta, in the kidney of an ox (*Annal. d Chem. und Phar.*. vol. xcix. p. 289), and by Drechsel, in the liver of the horse (Du Bois Reymond's *Archiv f. Physiol.*, 1891, p. 245). The only source for its study is thus the urine of cystinuric patients and the relatively small number of cystin stones removed by operation. In the urine, moreover, it is at best present in only very small quantities. According to Stadthagen (*Zeitsch. f. physiol. Chem.*, vol. ix. p. 129) it is not to be found in normal urine, while a related substance—cystëin—is thought by Goldmann and Baumann (*Ibid.*, vol. xii. p. 254) to be present in traces.

From the large amount of sulphur which cystin contains it is apparent that the substance is of albuminous origin, and the question naturally arises, Is cystin merely a transition product of the normal proteid metabolism of the body, which ordinarily disappears entirely or almost entirely, to be eliminated in the form of sulphuric acid, and which from sundry causes does not undergo this normal destruction, or is it formed only under pathological conditions? In all probability the former is the case. As a matter of fact, Jaffé (*Ber. d. deutsch. Chem. Gesellsch.*, vol. xii. p. 1092) and Baumann and Preusse (*Zeitsch. f. physiol. Chem.*, vol. v. p. 309) have shown that substitution products of cystëin, which in turn is readily oxidized to cystin, appear in the urine of dogs after the ingestion of mono-benzoyl bromide. Goldmann, working under Baumann's direction, has demonstrated, moreover, that in the dog, following the administration of cystëin, the greater portion of the sulphur is eliminated in the form of sulphuric acid, while the remainder goes to increase the neutral sulphur of the urine.

The disease would thus appear to be a metabolic anomaly, analogous to diabetes, gout, and others; and up to the time of Baumann and Udránszky's interesting discovery that certain diamines may be found in the urine and feces of cystinuric patients this view was generally held (*Zeitsch. f. phys. Chem.*, vol. xiii. p. 562). A new hypothesis then suggested itself, for as these substances were supposed to be formed only during the process of albuminous putrefaction, it appeared quite likely that cystinuria was actually a manifestation of an infectious process of the intestines. The diamines which were found by Baumann and Udránszky were cadaverin-pentamethylene-diamine—putrescin-tetramethylene-diamine—and a third diamine, isomeric with cadaverin, which was possibly neuridin or saprin. The urine and feces of Baumann's patient were examined from time to time during an entire year, and the diamines and cystin were invariably found, the cadaverin preponderating, as a rule, in the urine, while putrescin was more abundant in the feces.

At times, however, and almost exclusively so when the total amount of the diamines was small, the putrescin was in excess of the cadaverin in the urine as well. This observation Baumann attempted to explain by assuming that the cadaverin is formed in the upper portion of the intestinal tract, where the processes of absorption are especially active, while the putrescin essentially originates in the lower portion, and is more readily eliminated in the feces. Shortly after Baumann's publication Stadthagen and Brieger reported two further cases of cystinuria, in which they were able to confirm Baumann's observations by isolating cadaverin from the urine in pure form. Putrescin and the third diamine, however, were absent. Brieger fully accepts the theory that a causative connection exists between cystinuria and diaminuria, and explains the formation of cystin calculi by the assumption that the diamines which have been formed in the intestinal tract, as the result of a specific microbic activity, are absorbed into the blood, and there enter into combination with cystin. In the acid urine this compound is then decomposed, with the liberation of cystin, which in turn, being insoluble in water, is deposited in crystalline form. The accompanying cystitis Brieger refers to the irritating properties of the diamines.

Since Brieger's communication twenty-three additional cases of cystinuria have been recorded in the literature. In Leo's case Brieger was able to isolate large quantities of cadaverin. From Moreigne's writings it is not clear whether or not an examination was made in this direction. In Pfeiffer's last case and in those of Cohn no diamines were found. Baumann, who conducted the examination in the former instance, writes: "As the urine contained an abundant amount of cystin this result was so surprising to me that I re-examined the method employed for the isolation of diamines, and arrived at the conclusion that traces of diamines may thus escape detection." In the remaining cases no search for diamines was instituted. Baumann's case and those of Stadthagen, Brieger, and Leo are thus the only ones on record in which diaminuria was shown to accompany the cystinuria.

In view of this small number of positive findings and the great importance attaching to the problem, it seemed important to me to examine carefully into this question in my own case, and, if possible, to reconcile the conflicting reports.

That diamines are normally absent from the urine has been conclusively established. Under pathological conditions, if we except cystinuria, they are likewise absent. Baumann thus obtained negative results only in cases of cystitis, scarlatina, diphtheria, typhoid fever, pneumonia, perforative peritonitis, and extensive suppurative processes. I have myself sought for diamines in the urine under the most varying pathological conditions, and was likewise unable to find them. In the stools they have only been encountered in cholera, and in traces at times in typhoid fever. In the summer diarrhœa of infants and in dysentery I have uniformly obtained negative results.[1]

The method which I have employed in my examinations was that suggested by Baumann (*loc. cit.*):

In the case of the urine the collected amount of at least twenty-four hours is shaken with a 10 per cent. solution of sodium hydrate and benzoyl chloride, in the proportion of 1500 : 200 : 25, until the odor of the benzoyl chloride has entirely disappeared. The resulting precipitate contains phosphates, the benzoyl compounds of the normal carbohydrates of the urine, and a portion of the benzoylated diamines. This is filtered off with the aid of a suction pump and digested with alcohol. The filtered alcoholic extract is then concentrated to a small volume and poured into about thirty times its amount of water. Upon standing for from twelve to forty-eight hours the benzoylated diamines separate out in the milky fluid in the form of a more or less voluminous sediment, which is composed of fine and intensely white crystals. In order to remove the benzoylated carbohydrates which are likewise present the precipitate is re-dissolved in alcohol, the solution concentrated to a small volume, and diluted with water as described. This process is repeated several times, in order to obtain the benzoylated diamines in pure form. The resulting crystals, if both diamines are present, will loose their water of crystallization at 120° C. and melt at 140° C.

A small portion of the benzoylated diamines remains in the first filtrate. In order to recover these the filtrate is acidified with sulphuric acid and extracted three times with ether. The ethereal residue, before congealing, is placed in as much of a 12 per cent. solution of sodium hydrate as is required for its neutralization, when from three to four times its volume of the same solution is further added. This mixture is placed in the cold, when long needles and platelets will separate out, which consist of sodium-benzoyl-cystin and the benzoylated diamines. The sediment is filtered off and placed in cold water, in which the sodium-benzoyl-cystin dissolves, while the benzoylated diamines remain.

---

[1] Ross (Zeitsch. f. physiol. Chem., vol. xvi. p. 192) states that he found diamines in two cases of enterocolitis in adults.

In order to separate the putrescin from the cadaverin the crystals are dissolved in a little warm alcohol and treated with twenty times the amount of ether. Benzoyl-putrescin is thus thrown down, and may be recognized by its melting-point—viz., 175° to 176° C.—while the ethereal residue contains the benzoyl-cadaverin, which melts at from 129° to 130° C.

The diamines may be then separated from the benzoyl radicle by heating the crystals on the water-bath with a mixture of equal parts of alcohol and concentrated hydrochloric acid until a specimen is entirely dissolved by sodium hydrate. After two days the separation is complete. The solution is then diluted with water, when the benzoic acid which has been formed separates out and is filtered off. After extracting with ether, in order to remove any benzoic acid still remaining, the filtrate is evaporated to dryness. A crystalline mass remains, which is easily soluble in water and with difficulty in alcohol. This consists of putrescin and cadaverin hydrochlorate, from which the various double salts with platinum, silver, mercury, etc., can be readily obtained. The platinum salt of cadaverin is thus formed by adding an alcoholic solution of platinum chloride to a solution of the hydrochlorate in alcohol, as a voluminous yellow, crystalline mass, which can be purified by re-crystallization from hot water. When this salt is decomposed with sulphuretted hydrogen the hydrochlorate again results, from which the pure base is obtained by distillation with caustic potash. During this distillation water first passes over, and above 160° C. a colorless oil, the boiling-point of which is about 173° C. This constitutes the free base, which may be further recognized from its sperm-like odor and the avidity with which it attracts carbon dioxide to form a carbonate.

To isolate the diamines from the feces these are first digested with sulphuric alcohol. The alcohol is then evaporated off and the residue dissolved in water. This solution is further treated with sodium hydrate and benzoyl chloride, and the process continued as described above.

The urine and feces of my patient were examined in this manner upon a number of occasions. From the urine, as I have already pointed out, I was able to obtain cadaverin at all times, while putrescin was absent. The amount, however, varied considerably. As a rule, traces only were found, but on one occasion I isolated as much as 1.6 gramme of the benzoyl compound from the collected amount of twenty-four hours. In the stools cadaverin was likewise present, but in minimal quantities. Putrescin I was unable to find even on those days when the urine contained but very little cadaverin.

Upon the first occasion when I examined the patient's urine for the presence of diamines I obtained a voluminous amorphous precipitate upon standing, after having poured the concentrated alcoholic solution of the various benzoylated compounds present into water. I imagined then that the absence of crystalline elements at this stage of the process indicated the absence of diamines, and discovered only later that at times the process of purification must be repeated several times before crystallization begins. I regard it as important to make this note, as the negative results of other observers may possibly be referable to the same mistake.

This case of cystinuria is thus the fifth recorded in which diamines could be isolated from the urine. Why other observers have been less successful is, of course, difficult to determine.

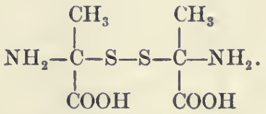
Possibly Baumann's method, as he suggests himself, is inadequate when traces only are present, and it would be desirable to ascertain whether Brieger's method or that of Gautier is more delicate. In every instance, however, I should urge that repeated examinations be made before a negative report is recorded. Single examinations which have yielded negative results, such as those of Pfeiffer and Cohn, can scarcely be regarded as conclusive; and the fact remains that diamines have been encountered in the urine in cases of cystinuria, and in these only. That a connection between the two conditions exists can scarcely be doubted.

As I have pointed out above, Baumann and Brieger incline to the belief that in cystinuria we are dealing with a specific infectious process, and the older view that the disease should be regarded as a metabolic anomaly had practically been abandoned when Moreigne's excellent work appeared. In this he points out the various objections which can be urged against the infectious theory, and though admitting the existence of a definite connection between the cystinuria and the diaminuria, he again relegates cystinuria to the domain of the metabolic diseases. He thus very properly suggests that it is difficult to conceive of an infectious process which persists not only for months or years, but even for a whole lifetime, as we see not infrequently in cases of cystinuria. The usual putrefactive organisms, moreover, which are found in the intestinal tract can scarcely enter into consideration, as the conjugate sulphates are rather diminished than increased in amount. Attempts at intestinal antisepsis by means of irrigation and the use of salol, also, have proven without effect, either upon the elimination of the diamines or the cystin. Were the production of diamines, moreover, the cause of the cystinuria, then we should certainly expect to find cystin in the feces also; but, as a matter of fact, cystin has never been encountered in the feces, and attempts to call forth cystinuria by the administration of putrescin and cadaverin to dogs have led only to negative results. (See Baumann and Udránszky, *Zeitsch. f. physiol. Chem.*, vol. xv. p. 77.) It has also been shown that traces only of the diamines are at times met with in the urine, notwithstanding the presence of cystin, and I have pointed out already that in my own case diamines were present in the feces only in traces, and at times even when cystin was present in considerable amount. A constant relation in the elimination of diamines and cystin does certainly not exist. In Pfeiffer's case Baumann himself made the observation that, notwithstanding the copious elimination of cystin in the urine, no diamines at all could be found, and we have the few observations in which but one examination was made to prove further that the diaminuria and cystinuria are not directly dependent the one upon the other. It thus appears that the infectious theory is not very strongly supported.

According to Harley, cystin is formed in the liver, and if we compare the chemical composition of cystin with that of taurin an intimate connection between the two is certainly apparent at once, taurin being the natural oxidation product of cystin:

$$NH_2—CH_2—CH_2—SO_3H.$$

Taurin.



$$NH_2—\overset{CH_3}{\overset{|}{\underset{\underset{COOH}{|}}{C}}}—S—S—\overset{CH_3}{\overset{|}{\underset{\underset{COOH}{|}}{C}}}—NH_2.$$

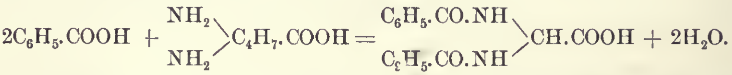
Cystin.

Marowski's observations (*Deutsch. Archiv. f. klin. Med.*, vol. iv. p. 449) on the association of cystinuria with acholia in the case reported by him have been adduced as evidence pointing toward the hepatic origin of cystin. It has been objected, however, that Marowski's case stands quite isolated in the literature, and that as a general rule cystinuria is not accompanied by any apparent hepatic disturbance. In Ultzmann's case, which is the only one in which the liver was carefully examined after death, neither cystin nor taurin could be demonstrated in the liver, spleen, or kidneys. It is possible, however, that in this case the cystinuria had ceased to exist, and, as a matter of fact, cystin could not be found in the urine after the removal of the stone, although a number of examinations were made in this direction. Similar instances have been reported in which the cystinuria disappeared after the removal of the accompanying calculus, so that Ultzmann's explanation that in his case also the cystinuria had actually ceased to exist does not appear so far fetched as would suggest itself at first. (See also the cases of Schweig, Roberts, Heath and others.) A temporary cystinuria without the formation of stone has also been described (Ebstein and others). The negative result obtained in Ultzmann's case can, hence, not be adduced as proof against the hepatic origin of cystin. As Moreigne suggests, moreover, the formation of cystin in the liver does not necessarily imply the existence of an anatomical lesion. Scherer (*loc. cit.*) found cystin in the liver of a drunkard who had died from typhoid fever, and Drechsel was likewise able to demonstrate its presence in the urine after poisoning with phosphorus. If we further add to these data the fact that leucin and tyrosin, the appearance of which in the urine is notably associated with hepatic lesions, have likewise been found in connection with cystinuria (Conti and Moreigne), we are in possession of a number of interesting facts which are highly suggestive.

Külz (*Zeitsch. f. Biologie*, vol. xxvi. p. 415), it is true, obtained cystin as one of the products of artificial pancreatic digestion, and thus reopened the path toward a further hypothesis concerning its intestinal origin. The test-tube experiment, however, cannot be regarded as immediate proof that the same process takes place in the human body, and Goldmann's experiments certainly show that under normal conditions the ingestion of cystëin, and consequently of cystin, increases the sulphuric acid of the urine to a large extent. There is no necessity, moreover, for assuming an intestinal origin of cystin, as the experiments of Jaffé, Baumann, and Preusse (*loc. cit.*) prove conclusively that substitution products of cystëin and hence also of cystin can be formed in the body directly.

Accepting the intra-organic origin of cystin, it is of course clear that its elimination can be possible only if the processes of oxidation which take place in the body are seriously impeded, and the question naturally arises, Are there any facts in support of such a theory, and, if so, in what relation does the diaminuria stand to the cystinuria?

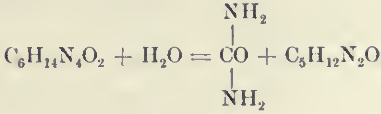
The infectious theory of cystinuria, as I have pointed out, owes its origin entirely to the observation that cystinuria may be accompanied by the formation of diamines, which in turn are generally regarded as specific products of microbic activity. Could it be proven that diamines can be formed in the body tissues in the absence of putrefactive organisms, it is apparent at once that this theory would fail in its main support. A number of facts exist which tend to show that this is not only possible, but even probable. It is thus a well-known fact that following the ingestion of benzoic acid or toluol by chickens ornithuric acid appears in the urine, which in turn results from the union of benzoic acid and ornithin, according to the equation:



$$2C_6H_5.COOH + \left.\begin{matrix}NH_2\\NH_2\end{matrix}\right> C_4H_7.COOH = \left.\begin{matrix}C_6H_5.CO.NH\\C_6H_5.CO.NH\end{matrix}\right> CH.COOH + 2H_2O.$$

If ornithin, moreover, is heated, carbon dioxide is liberated and putrescin or tetramethylene-diamine remains.

An indirect proof is thus furnished which goes to show that the formation of one diamine at least can occur within the body tissues without the intervention of micro-organisms. Schulze and Winterstein (*Zeitsch. f. physiol. Chem.*, vol. xxvi. p. 1) furthermore have demonstrated conclusively that ornithuric acid results as one of the decomposition products of one of the hexon bases—viz., arginin, when this is boiled with baryta water, and from the ornithuric acid the free base can be readily obtained. Ornithin, according to the researches of the observers just named, must be regarded as diamido-valerianic acid. As urea, moreover, is formed at the same time during the decomposition of the arginin, it is perhaps admissible to regard this as a derivative of guanidin, and to express the formation of urea and ornithuric acid by the equation :



$$C_6H_{14}N_4O_2 + H_2O = \underset{\substack{| \\ NH_2}}{\overset{\substack{NH_2 \\ |}}{CO}} + C_5H_{12}N_2O_2.$$

As arginin, finally, is in all likelihood represented in the protamine radicle of all albuminous bodies, as Kossel suggests, we can readily conceive how in the human body also putrescin, at least, may be formed without the intervention of micro-organisms. If this be true, cadaverin may be formed in a similar manner, and it is possible that further researches, which are now being conducted in my laboratory, may show one of the other hexon bases which have thus far been isolated—viz., lysin and histidin—to be the mother-substance of this diamine.

The association of diaminuria with cystinuria becomes further apparent if we consider that in certain albuminous bodies at least a benzoyl radicle exists together with the protamine radicle. We thus know that during the decomposition of albumins by means of acids or alkalies, or as the result of the action of trypsin and putrefaction, bodies of the aromatic series are formed. That a non-hydroxylated benzoyl radicle, moreover, is present is apparent from the fact that benzoic acid and benzaldehyde result from the oxidation of albumins, and that phenyl-alanin—viz., phenyl-amido propionic acid—is found among the products of decomposition. During the hydrolytic decomposition of the albumins the hydroxylated and the non-hydroxylated benzoyl radicles occur in the form of phenyl-alanin and tyrosin. The close structural relation existing between phenyl-alanin and cystëin finally suggests the possible origin of cystin, and we can readily imagine that both cystin and the diamines will result if for any reason the oxidation processes, which take place in tissues rich in sulphur, such as the liver, are seriously impeded. If this diminution in the power of oxidation on the part of the body tissues or separate organs affects the protamine and the non-hydroxylated benzoyl radicles alike, both diamines and cystin will appear in the urine, while only one of these bodies will appear if the oxidation of one radicle only should be incomplete. We can thus readily understand the varying relations which may be observed in the elimination of these bodies in the urine.

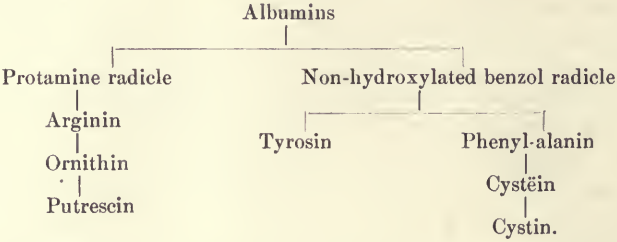
The relation between phenyl-alanin and cystëin is represented by the formulæ:

$$C_3H{-}CH(NH_2){-}COOH. \qquad CH_3{-}C(NH_2)HS{-}COOH.$$

Alanin. Cystëin.

Chabrié (*loc. cit.*), who attempted the synthetical production of cystin by starting with alanin, was unsuccessful in his experiments; but, like Moreigne, I believe that further investigations conducted upon these lines may lead to positive results.

To summarize the foregoing considerations I should suggest the formation of cystin and its association with diamines, according to the following scheme:



From this it is apparent that theoretically, at least, tyrosin also could accompany the elimination of cystin and diamines, and, as I have already shown, two cases are actually on record in which this has been observed. Conti thus states that in his case tyrosin was often, though not invariably found, and Moreigne was able to demonstrate its presence in a calculus passed by his patient, as well as in the urine where leucin was also found when the examination was conducted according to his special method. I have employed this method upon several occasions in my own case, and have also attempted to isolate tyrosin from large quantities of urine, according to the usual methods, but was unsuccessful in every instance. On the day, however, when cadaverin was present in such large amounts this was unfortunately neglected, and I should suggest that in future cases special attention be paid to this particular point.

As Moreigne's method is but little known, I describe it at this place: A small amount of the sediment or of the calculus is brought in contact under the microscope with a trace of hydrochloric acid, just sufficient to moisten the deposit, when the platelets of cystin, which are soluble in the concentrated acid, will be seen to disappear, while the tyrosin, which is almost insoluble under the same conditions, separates out in the form of needles arranged in the characteristic sheaves and rosettes. If dilute acid be used, on the other hand, the cystin and tyrosin will both dissolve (*Compt. rend. de la Soc. de Biol.*, 1898).

Through the researches of Schützenberger, Gautier and others we now know that leucin and tyrosin, as well as the other amido acids formed in the body economy, result from a process of hydration and splitting-up of the albuminous molecule, and that under normal conditions these bodies do not appear in the urine, but undergo a more complete disintegration, under the influence of processes of oxidation. In part, at least, they give rise to the formation of urea. Following the ingestion of leucin, according to Schultzen and Nencki, a corresponding increase in the amount of urea is thus observed in dogs. The remainder of the molecule is then apparently transformed into valerianic acid, which is further oxidized, according to the law of Wöhler, and finally gives rise to water and carbon dioxide. Tyrosin similarly disappears under normal conditions, yielding the divers phenol compounds which occur in normal urine, as well as some ammonia, which contributes toward the formation of urea.

It is thus apparent that the appearance of both leucin and tyrosin in the urine implies an inability on the part of the body to complete its normal processes of decomposition, and especially those of oxidation.

The diamines are normally also removed in the same manner, as also the cystin, so that the appearance in the urine of either or all of these bodies necessarily indicates a metabolic anomaly, in which the power of oxidation on the part of some or all of the body tissues must be at fault. The diaminuria is thus neither the cause nor the effect of the cystinuria, and both are merely symptoms indicating a general disturbance of the normal metabolism.

This view of the nature of cystinuria is further strengthened by the following observations: First, the occurrence of cystinuria in families, in which respect the disease can be placed in the same category as diabetes, gout, rheumatism, obesity, etc. Second, we know through the painstaking researches of Moreigne that the nitrogen coefficient—viz., the ratio of the urea-nitrogen to the total nitrogen—is constantly and uniformly diminished. The absolute amount of the completely oxidized sulphur is likewise diminished, as is also the sulphur coefficient as a whole, while the total amount of sulphur is not increased, but remains normal. The same is true of the ratio existing between the total sulphur and the total amount of nitrogen. Inversely there is a considerable increase in the ratio between the incompletely oxidized and the total sulphur. At the same time there is a constant diminution in the ratio between the urea and the total solids and between the urea and the total amount of organic matter. The ratio between the phosphoric acid and the total amount of nitrogen is similarly diminished, while the urinary extractives are increased. Moreigne further regards the existence of obesity in his case as evidence of a retardation in the normal processes of oxidation, and I am personally inclined to explain the extremely slow progress of bony union which occurred in my patient upon the same basis. The older observations on the association of cystinuria with chlorosis, anæmia, scrofulosis, rheumatism, etc., thus gain in significance, and it is desirable that in future investigations more attention be directed to the general health of the patients than has been done in the past.

In what tissues of the body the retardation in the normal metabolic processes is likely to occur in cystinuria is difficult to determine. The evidence, I believe, is in favor of the view that, to a certain extent, all the tissues are concerned in this anomaly; but it seems very likely that the liver plays the most important rôle. We know that in this organ the greater portion of the sulphur bodies is formed, and I have already pointed out that in one case at least cystin has actually been demonstrated in the liver of the human being. My other reasons which further incline me to this belief I have elaborated above.

Postscript.—Since writing the above my attention has been drawn to a further case of cystinuria, reported by E. Bodtker (*Norsk. Mag. f. Laegevindenskaber*, 1892, p. 1220), in which diamines were apparently also found.

In one of the Hopkins cases, moreover, Dr. S. Amberg was able to demonstrate the presence of traces of diamines in the feces, while an examination of the urine was negative, although cystin was present in moderate amount.

ON SPLENIC ANÆMIA.

By William Osler, M.D.,
PROFESSOR OF MEDICINE, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD.

Under the names of splenic pseudoleukæmia, anæmia splenica, lymphadénie splénique, and the splenic form of Hodgkin's disease is described an idiopathic enlargement of the spleen with anæmia. I prefer the name splenic anæmia, which indicates the two essential features.

From Griesinger's clinic, in 1866, Gretzel[1] described a case of enlargement of the spleen with anæmia in a child of ten months. Griesinger, who termed the condition anæmia splenica, had many such cases in adults which had terminated fatally. He recognized the condition as a non-leukæmic counterpart of the ordinary splenic leukæmia.

In 1871, H. C. Wood,[2] of Philadelphia, in a paper on the relations of leukæmia and pseudoleukæmia, brought the subject to the notice of the profession in this country. After speaking of the two forms of the

[1] Berliner klinische Wochenschrift, Band iii.

[2] The American Journal of the Medical Sciences.

latter, in which the lymphatics are involved alone, or the lymphatics with the spleen, he says: "I now desire to show that there is still a third form of pseudoleukæmia—a splenic variety. Under the names of tumor of the spleen, splenic cachexia, etc., from time far back, medical records furnish accounts of cases which I believe represent this affection." The case which he reported was very characteristic; the spleen was enormously enlarged and the anæmia extreme, without any increase in the leucocytes. Usually described with Hodgkin's disease or pseudoleukæmia, splenic anæmia has not received until lately widespread recognition. Thus while familiar with the papers of Wood, Strümpell and others, and although I had had cases under my care, I did not discuss the diseases in a separate section in Pepper's *System of Medicine*, 1885, vol. iii., but only referred to it under the differential diagnosis in pernicious anæmia and in leukæmia. The critical summary of the literature, by Dr. Sippy, in the November number of this JOURNAL (in which, by the way, Dr. Wood's paper is overlooked) makes superfluous any additional references to the literature of the subject. I give here, as briefly as possible, my experience with this condition, limiting the cases strictly to those which have presented a primitive splenomegaly and anæmia without enlargement of the lymph-glands. I purposely have not spoken of anæmia with enlarged spleen in very young children, a subject which requires separate consideration.

CASE I. *Malaria in India some years previously; no syphilis; recurring attacks of hemorrhage from the stomach; enlarged spleen; progressive anæmia; ascites; death from hæmatemesis.*—This patient, a man, aged thirty-six years, was admitted to the Montreal General Hospital, September 2, 1879, with anæmia. He had a very much enlarged spleen, which extended to the navel, and the lower edge was below the transverse navel line. There was no enlargement of the lymph-glands. The red blood-corpuscles were under 2,000,000 per c.mm. The hæmoglobin unfortunately was not estimated. There was no leukæmia. He had served with the army in India, and had had intermittent fever. He had had recurring attacks of hæmatemesis. Two months before admission he began to have dropsy of the legs and abdomen.

CASE II. *Severe hæmatemesis at the ninth year, again at the eleventh year; anæmia; swelling of the feet; enlarged spleen.*—Girl, aged eleven years, seen August 13, 1879. Two years before she had had a very severe hemorrhage from the stomach, from which she recovered, though she remained somewhat pale. A month before I saw her she had a second attack, in which she lost, the mother said, nearly three quarts of blood in thirty-six hours. She was very anæmic. The red blood-corpuscles were 2,250,000; leucocytes, 7120 per c.mm.

These two cases were reported in full in the *Canada Medical and Surgical Journal*, vol. xi.

CASE III. *Recurring attacks of hæmatemesis and melæna between* 1885 *and* 1897*; excellent health in the intervals; chronic enlargement of the spleen; death in an attack. Anatomical summary: Chronic hyperplasia* *of the spleen; liver smooth, macroscopically showing no signs of cirrhosis; microscopically showing only fatty changes.*—W. M., aged thirty-five years, seen on December 9, 1892, complaining of hemorrhage from the bowels. This patient was very anæmic after each hemorrhage. When I saw him first he was only slightly anæmic. The blood was examined, but unfortunately the slip with the count was mislaid. There was no leucocytosis, no enlargement of the lymph-glands.

CASE IV. *No history of malaria or of syphilis; nearly ten years ago first attack of hæmatemesis; since then, at intervals of about a year, very severe attacks, in which he vomited blood and passed blood in the stools; enlarged spleen; exploratory laparotomy; stomach and duodenum normal; liver smooth, not cirrhotic; removal of enlarged spleen; recovery.*—C. D. B., aged thirty-three years, of Fincastle, Va., farmer, admitted on March 9, 1898, complaining of hemorrhages from the stomach and bowels, and pain, with enlargement in the left side of the abdomen. On his first admission, four months after the last hemorrhage, the red blood-corpuscles were 3,000,000, the leucocytes 2800 per c.mm., and hæmoglobin 25 per cent. Differential count: polymorphonuclears, 84.4 per cent.; small mononuclears, 4.4 per cent.; large mononuclears, 5 per cent.; transitionals, 3.4 per cent.; eosinophiles, 2.8 per cent. There was no enlargement of the lymph-glands. This patient has been heard from a year subsequent to the removal of the spleen, and he continues well.

CASE V. *No malaria; no syphilis; eleven years ago first attack of hæmatemesis; for four or five years recurring attacks of melæna; in* 1892 *second attack of hæmatemesis; an occasional attack of melæna; January,* 1898, *severe hæmatemesis and melæna; great enlargement of the spleen; marked anæmia of the chlorotic type*—A. B., aged thirty-eight years, of Durham, N. C., admitted to Ward C, on November 10, 1898, complaining of hemorrhages from the stomach. In this very remarkable case the hemorrhages have recurred for nearly twelve years, as I have heard within a few weeks (November, 1899) that he has had another severe attack. He had been persistently pale for many years. The blood on admission gave hæmoglobin 30 per cent.; red blood-corpuscles, 4,000,000; leucocytes, 6500 per c.mm. Differential count: polymorphonuclears, 73; small mononuclears, 10; large mononuclears, 12; transitionals, 3; eosinophiles, 2.

Cases III., IV., and V. have been reported in full in the *Edinburgh Medical Journal,* May, 1899.

CASE VI. *Hæmatemesis and melæna in April,* 1898*; enlarged spleen; second attack of hæmatemesis in October,* 1889*; swelling of abdomen and feet; melanoderma.*—W. H., aged twenty years, admitted to Ward F, January 14, 1890, complaining of swelling of the abdomen.

Family History. Mother died, aged forty-six years, of disease of the lungs; father died at thirty years, cause unknown; one brother has had malarial fever.

Personal History. Until 1887 he lived at Centreville, Md., which is in a malarial district. For the past five or six summers he has had attacks of what was called bilious fever, with vomiting for a few days, but no jaundice or pain. The first attack was the most severe, and in it he became very pale and sallow, and had œdema of the legs. He does not think he has ever had malaria; he is sure that he has never had ordinary ague.

In April, 1889, after feeling wretchedly for a month, he vomited a good deal of blood, and passed dark blood in the stools. He was in bed at this time for three or four weeks. In May there was first noticed an enlargement in the left side of the abdomen. In June the patient applied at the out-patient department, complaining of uneasy feelings in the abdomen, headache, and weakness. At that time the spleen was noticed to be very large, and the notch was distinctly felt. He got better throughout August and September, and was able to work for three weeks. Early in October he had a second and more severe attack of vomiting of blood. This recurred on three successive days. It was dark-colored, and the stools again became bloody as before. He had slight fever, headache, and increasing swelling of the abdomen and of the feet.

On admission the patient had a very remarkable mottling of the face, with brown pigment. There was a good deal less pallor than when he was seen in June. There was a general brownish discoloration of the skin everywhere; no pigmentation of the mucous membranes. The conjunctivæ were very pearly. The examination of the abdomen showed a greatly enlarged spleen, which toward the middle line reached to within an inch and a half of the umbilicus, and below to within three inches of the crest of the ilium. It was smooth and not painful. The liver was not enlarged. The superficial lymph-glands were not enlarged.

Blood. On admission, January 14th, the red blood-corpuscles were 2,187,000; leucocytes, 12,497. There were no microcytes, no poikilocytosis. He was placed upon Fowler's solution, and he improved rapidly. The color got better, and on January 23d the red blood-corpuscles had risen to above 3,000,000. He progressively improved, and on February 5th the red blood-corpuscles were 3,912,500 and the leucocytes 18,720. He left the hospital on March 24th greatly improved, his weight having risen from 140 pounds on admission to 154 pounds. While in the hospital he had slight fever—99° to 100°, and it once rose to 102°. I have not been able to learn the subsequent history of this case.

Case VII. *Residence in a malarial district; no attacks; no syphilis; progressive enlargement of the spleen, with anæmia; melanoderma.*—W. R., aged forty years, of Port Antonio, Jamaica, referred to me on May 18, 1895, by Dr. Henderson, of Kingston.

Personal History. A native of Jamaica, he had malaria when a boy, and has lived in Port Antonio and the neighborhood for some years (which is a very malarial district), but has never had chills or fever, and has never been laid up in bed. He has at times had slight feverish attacks. He has not had syphilis.

The present trouble dates from about two years ago, when he began to get pale and lost his weight—from about 165 to 148 pounds. He has worked steadily until April of this year, when he consulted Dr. Henderson, of Kingston. The doctor writes that he found him suffering from anæmia, with considerable enlargement of the liver and great increase in the size of the spleen, which came down nearly to the iliac crest, and extended inward to within one inch and a half of the umbilicus.

Present Condition. Patient was remarkably bronzed on the face and hands, and there was a diffuse pigmentation of the whole skin The mucous membranes were not anæmic; not pigmented. There was an old scar on the left ankle, and a small fresh abrasion on the right shin, in the neighborhood of these there were remnants of extensive fresh hemorrhages; a similar very large one existed over the dorsum of the left foot. He said there had been recurring hemorrhages in the skin of the legs. The pulse was steady and strong—80 to the minute. The heart-beat was in the fourth interspace; the sounds were everywhere clear.

The abdomen was prominent. An enormous spleen occupied almost the entire left side, extending to within three finger-breadths of the pubes and about two finger-breadths beyond the middle line, just below the navel. The lower and anterior borders were felt readily; the notch was just at the navel. The surface was smooth; pressure was not painful. The flatness extended to the upper border of the eighth rib in the mid-axillary line. The liver was not so much enlarged as at the time of Dr. Henderson's examination. It extended only two finger-breadths below the costal margin in the nipple line.

Blood count (Dr. Thayer): red blood-corpuscles, 4,816,000; white blood-corpuscles, 5000; hæmoglobin, 55 per cent. There were no nucleated red blood-corpuscles; there was no poikilocytosis. The large mononuclear elements were more numerous than the small; the eosinophiles were also slightly increased.

CASE VIII. *Recurring attacks of diarrhœa; tumor in the left side noted three years ago; no hemorrhages; progressive anæmia, with greatly enlarged spleen.*—Mrs. Phœbe N., aged fifty-six years, admitted on October 15, 1896, complaining of diarrhœa and swelling of the abdomen. There was nothing of any moment in her family history. She has had six children; has always been very well and strong. She has not had malaria.

She dates her present illness from three years ago, when, after an attack of diarrhœa, she noted a swelling in the left side beneath the costal margin. From the onset she noticed that her color was bad, of a grayish-brown, unhealthy tint. The diarrhœa had been a very persistent feature in her case, and she had to exercise the greatest caution in diet, and sometimes had as many as six to twelve greenish-watery stools in the twenty-four hours. She has never passed any blood or mucus. There had been intervals of from one to three weeks when the diarrhœa would stop entirely. The tumor which she had felt in her left side had increased, and it caused a dragging, uneasy sensation. She has had no hemorrhages, no œdema, no ascites.

Present Condition. The patient was a small woman, not specially emaciated, but of a very pale, gray, pasty-brown color; mucous membranes pale; tongue slightly coated; no special pigmentation. There were hæmic murmurs at the base of the heart.

The abdomen presented a marked prominence on the left side and a bulging just to the left of the umbilicus. This area was occupied by a large solid mass, with sharp border and two well-defined notches, one above the navel and one a little to the right and below. The whole mass was readily movable on bimanual palpation. On percussion the flatness extended from the sixth rib in the nipple line.

Blood. Hæmoglobin, 60 per cent.; red blood-corpuscles, 3,600,000; white blood-corpuscles, 3000 per c.mm. There was a slight poikilocytosis; the corpuscles looked pale. No nucleated red blood-corpuscles. A differential count of the leucocytes gave: polynuclears, 66; small mononuclears, 25; large mononuclears, 7; transitionals, 2; eosinophiles, 1.

The feces were of a greenish-brown color, contained no blood, no mucus, no parasites, no ova of parasites. They were repeatedly examined.

The patient remained in the hospital until October 21st. She improved; the red blood-corpuscles rose to 4,300,000, hæmoglobin 60 per cent., leucocytes 6000 per c.mm. There was no change in the differential count of leucocytes. The urine had a specific gravity of 1022; contained no tube-casts or albumin. The patient had no fever during her stay in the hospital.

CASE IX. *Chills and fever when a child—febrile attacks in* 1892, *six years before death, in which enlargement of the spleen was noticed; gradual anœmia; in May,* 1895, *ascites; recovery; in May,* 1897, *again ascites; recovery; progressive anœmia; greatly enlarged spleen; early in* 1898 *again ascites; repeated tappings; death; spleen enormously enlarged; no cirrhosis of the liver.*—D. S. C , aged fifty-eight years, a physician from Illinois, consulted me on October 29, 1897, complaining of anæmia and an enlarged spleen. He had had chills and fever as a child of seven, inflammatory rheumatism at ten years of age. In 1872 had a bad attack of erysipelas. He has been a temperate man and a very hard worker.

The present illness began in the winter of 1892–1893 with a fever, which recurred at intervals for six weeks, but which seemed to be checked easily with doses of quinine and atropine. He did not feel very ill and kept at work. Toward the end of this attack there was a slight swelling and redness of the right ankle. He noticed now for the first time that the spleen was enlarged, but it was not very prominent. In 1893 and 1894 " he worked along," not feeling very robust, and he thinks that the spleen continued enlarged all this time. In May, 1895, he became very anæmic and weak, and, not improving through the summer, he gave up work for eight months. In this attack, in addition to the anæmia and enlargement of the spleen, he had ascites In January he felt better and went home and began work again, and continued to practice during the winter of 1896–1897. He says the spleen was at this time enlarged. In May of that year he again became very anæmic and pale, and took much iron and arsenic. The abdomen also became swollen, but was not so large as in 1895, and he had œdema of the feet; both disappeared. The blood count, which he had made at that time, showed 4,400,000 red blood-corpuscles; 5100 white blood-corpuscles per c.mm.

Present Condition. He looked a little pale, was not specially emaciated. Tongue was of good color, pulse of good volume, superficial bloodvessels not specially full.

The abdomen was large and the navel projected, and to the left of it there was a very marked prominence, which descended with each inspiration, and in it a distinct notch could be seen. A second prominent mass was seen just below the left costal margin. On palpation these two masses were found to be continuous, evidently a very greatly enlarged spleen, firm and hard, with rounded edges; the notch, which was visible, could be readily felt. The edges were singularly rounded; the surface was smooth. The edge of the liver could be felt just two finger-breadths below the costal margin outside the right rectus. The outlines on percussion did not show any enlargement. There was a small ecchymosis just to the left of the navel; the superficial veins were not distended; the superficial glands were a little enlarged.

Blood (Dr. Futcher): moderate poikilocytosis, slight increase in the average size of the red corpuscles, a few microcytes and macrocytes, apparent diminution in the number of leucocytes. Blood count: red blood-corpuscles, 4,788,000; white blood-corpuscles, 5200; hæmoglobin, 60 per cent. The percentage of the different leucocytes was as follows: Small mononuclears, 52; large mononuclears, 2; transitionals, 4.8; polynuclears, 40; eosinophiles, 1.2. In stained specimens the same poikilocytosis was noted, and variations in size, as in the fresh specimens. There were no nucleated red blood-corpuscles.

On January 4, 1898, the swelling became so great that he had to be tapped, and an enormous quantity of fluid was withdrawn. The operation was repeated again in four weeks. Early in February he had a very severe attack of sciatica, hiccough developed, and he became greatly enfeebled. He sank gradually, and died on the 12th of February. The spleen was enormously enlarged. There was no cirrhosis of the liver.

CASE X. *Residence in a malarial region; occasional attacks of chills and fever; chancre, no symptoms; progressive weakness and anœmia; epilepsy for years; greatly enlarged spleen; anœmia; melanoderma.*—Cornelius B , aged thirty-nine years, of Port Royal, S. C., admitted to Ward C, June 15, 1898, complaining of epilepsy, hemorrhages, and progressive weakness. There was nothing of any moment in his family history. He has always lived in a malarial district, and nine years ago had two congestive chills, and following this for three years he had occasional attacks of malarial fever. He had gonorrhœa ten years ago, and a non-indurated sore three years ago, not followed by symptoms. For five or six years he has had hemorrhoids. He is a moderate drinker. He has had epilepsy for nearly eighteen years; the attacks now recur about once a month. The patient has been growing progressively weaker for the past six or eight months. He has never noticed anything in the abdomen. He came to consult me, complaining of epilepsy and a nervous breakdown.

Present Condition. His face had a sallow look, which he attributed to his occupation, as he had been out in the open air fishing a great deal. The lips and mucous membranes had a good color. The general surface of the skin had a slight degree of dark brownish pigmentation, with here and there little patches of leucoderma. His weight was 138 pounds. He had no fever, and the pulse was of good volume, 92 per minute. The superficial lymph-glands were easily palpable, perhaps in places a little enlarged. With the exception of a soft apex systolic murmur there was nothing of note in the examination of the chest.

Abdomen. The spleen was greatly enlarged, reaching 7 cm. below the costal margin in the parasternal line. Above the flatness began in the sixth interspace; anteriorly the margin could be felt close to the navel. The edge was sharp, easily felt, the surface smooth and painless. The liver flatness began at the fifth space in the nipple line, and extended 3½ cm. below the costal margin, 12 cm. in vertical extent. The edge of the organ was distinctly palpable and felt normal.

Blood. A fresh specimen showed considerable poikilocytosis, with megalocytes and microcytes; no nucleated red corpuscles were seen. There were no malarial organisms and no pigment. Blood: red blood-corpuscles, 4,128,000 per c.mm.; white blood-corpuscles, 2800 per c mm.; hæmoglobin, 45 per cent.

The urine was of a low specific gravity, 1010 to 1014; there were no tube-casts, no albumin.

The patient remained under observation for two weeks, during which time he improved, and was then transferred to the surgical side for operation on the hemorrhoids.

An interesting point was the fact that this patient did not know that his spleen was enlarged. He had had no treatment, and consulted me for the epilepsy.

CASE XI. *In* 1891 *obscure abdominal attack, thought to be peritonitis; color not good since; April,* 1898, *spleen found to be greatly enlarged; progressive anæmia; persistent enlargement of the spleen; stone in the bladder; operation; death.*—J. K. E., aged fifty-seven years, seen early in September, 1898, with Dr. Graham, of Toronto, and he was under my subsequent care through January and February, 1899. The patient has always been a strong, healthy man, high-strung and nervous, actively engaged in political and legal work. His habits have been good; he has taken alcohol in moderation; has never been what would be termed a heavy drinker. In 1891 he had an obscure abdominal attack, the nature of which was never very clear. His doctor at that time thought it was possibly peritonitis. He does not think that he has ever been quite the same since, particularly in the matter of color, though he has of late years been able to attend to a great deal of work. In the early part of 1898 his wife and others noticed that he was becoming very pale, and in April he discovered that he had a lump in the left side of the abdomen. The first blood count was made in June by Dr. Harold Parsons, when the hæmoglobin was found to be 37 per cent. and the red blood-corpuscles somewhat under 2,500,000; the leucocytes were normal. Throughout the summer he did not do well. The pallor persisted; he had a little swelling of the feet, and he also had dyspepsia. In August, a little before I saw him, he had 45 per cent of hæmoglobin, and the corpuscles were rather more than two millions and a half; leucocytes normal. In September, when I examined him with Dr. Graham, the pallor was marked; he had lost about fifteen pounds in weight The spleen was considerably enlarged, extending more than a hand-breadth below the costal margin. The superficial glands were not enlarged; liver was not enlarged. Dr. Graham regarded the case as one of anæmia splenica, in which opinion I concurred. All through the summer he had at intervals attacks of slight fever; sometimes the temperature would go as high as 101°; more frequently it would be an afternoon temperature of 100°.

On admission to the private ward there was no special change since I saw him in September; no loss in weight. Pulse was 72, regular, good tension. The abdomen looked full in the left flank and under the left costal margin. The spleen extended to about the level of the navel, to the right about three finger-breadths from the middle line; it felt round and firm; the notches were not distinct. It extended deep in the flank below the level of the anterior superior spine. The edge of the right lobe of the liver was readily felt just below the costal border on deep inspiration; left lobe of liver could also be felt two finger-breadths below the ensiform cartilage. There was no enlargement of the superficial lymph-glands.

Repeated very careful blood counts were made in this case by Dr McCrae through January and February. The hæmoglobin was at about 40 per cent. It rose on February 10th to 50 per cent. On January 15th and 29th it was 40 per cent The red blood-corpuscles were 3,328,000 per c.mm. on the 15th, and they had gained only a few hundred thousand on February 10th. The highest leucocyte count was 4000 per c.mm. on February 4th. On January 29th it was 2000. The differential count was as follows: Polynuclear, 78; small mononuclear, 6; large mononuclear, 13; transitional, 2.5; eosinophiles, 0.5 per cent. There was no poikilocytosis, but an occasional nucleated red blood-corpuscle was seen.

The patient improved somewhat through the spring, then symptoms of stone came on. Death followed the operation of lithotomy.

CASE XII. *Dyspepsia for many years; July* 9, 1899, *profuse hemorrhage from the stomach, again on the* 16*th and* 26*th; marked anæmia; ascites; paracentesis; greatly enlarged spleen.*—L. F. W., aged forty years, was referred to me on October 18, 1899, by Dr. Moran, of Roxbury, Mass. Up to eight years ago he was a very healthy man. He had not had malaria. No history of syphilis. Had been a temperate man. For the past eight years he had had dyspepsia, and on several occasions had vomited. He had had no pain, and had kept at work. During the first week of July of this year he did not feel very well; then on the evening of July 9th he had a profuse hemorrhage from the stomach, in which he brought up, he says, four quarts in three separate attacks. On the 16th he had a second hemorrhage, and on the 26th two more, one of which was very severe. Naturally the bleeding was thought to come from an ulcer, and he was kept very quiet and had rectal feeding for many weeks. He gradually began to improve, although he was very weak and debilitated. The abdomen became progressively larger, owing to dropsy, and he was tapped about five weeks ago, and six quarts of fluid drawn off. On his way to join relatives in Baltimore he consulted Dr. Vickery, of Boston, who found a greatly enlarged spleen.

Present Condition. He was not emaciated; still looked pale. The abdomen was full, and under the left costal border there was a slight prominence. On palpation the spleen was found to be greatly enlarged, the lower border extended exactly to the level of the navel. Anteriorly it reached to the parasternal line. The border could be distinctly felt. The liver was not enlarged. The ankles were not swollen. There was a soft hæmic murmur over the base of the heart. There were no retinal hemorrhages.

Blood. Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,208,000; white blood-corpuscles, 4000 per c.mm. A differential count of 300 white blood-corpuscles gave: polynuclears, 65.6 per cent.; small mononuclears, 15 per cent.; large mononuclears, 12.6 per cent.; transitional, 3.3 per cent.; eosinophiles, 3.3 per cent.; no nucleated red blood-corpuscles or myelocytes were seen.

CASE XIII. *Failing health; vomiting and diarrhœa; profound anæmia; greatly enlarged spleen; rapid improvement under treatment.*—Mrs. C., aged forty-four years, colored, laundress, admitted to Ward O, on October 12, 1899, complaining of great weakness, nausea, and vomiting. Her husband died of tuberculosis. She has three children, one now tuberculous. She has had the usual disorders of childhood; has never had typhoid fever or malaria. She has had no miscarriages. She has had indigestion all her life; has been a hard-working woman, and has had to support her children for many years.

Present Illness. For the past three months she has been failing in health; has had loss of appetite, progressive weakness, and for the past six weeks much nausea, vomiting and diarrhœa. She gave up work about September 1st, and has been in bed ever since. She has felt giddy at times, and her eyesight has been dim. She has lost about fifteen pounds in weight. She has been short of breath on the slightest exertion.

She was a slenderly-built, fairly well-nourished, light mulatto woman; the mucous membranes very pale. There were all the objective features of extreme anæmia.

The abdomen looked full and prominent, particularly in the left half, and the left subcostal groove was obliterated. On palpation a large tumor was felt in the left hypochondriac region, extending into the epigastric region as far as the middle line. The border reached 7 cm. from the left costal margin. The edge was rounded. On bimanual palpation the mass could be grasped between the hands, and the posterior edge could be well felt. The surface was smooth, and there was no pain. There was no friction over it; no bruit. The liver flatness began at the sixth rib, and extended 7 cm. below the costal margin in the nipple line. The edge of the left lobe could be well felt 5 cm. above the navel. The surface was smooth. The superficial lymph-glands were not enlarged. The posterior cervicals were perhaps a little larger than normal. No retinal hemorrhages.

Blood. Hæmoglobin, 23 per cent.; red blood-corpuscles, 1,540,000; white blood-corpuscles, 3300. Differential count of 300 leucocytes gave: polymorphonuclears, 74; small mononuclears, 19.6; transitionals, 2.6; large mononuclears, 1.6; eosinophiles, 1.5; myelocytes, 1.5; forty-five nucleated red blood-corpuscles were met with in counting 300 leucocytes, thirteen of which were megaloblasts. (Miss Reed.)

On October 17th a blood count was made by Dr. McCrae. Hæmoglobin, 20 per cent.; red blood-corpuscles, 1,380,000; white blood-corpuscles, 3250. Differential count showed no special changes from that previously noted. In 400 leucocytes there were 1.25 per cent. myelocytes. In counting the 400 leucocytes there were 75 nucleated reds, 21 of which were normoblasts, 19 megaloblasts, and 35 intermediate. Three was very marked poikilocytosis. There were some enormous nucleated red blood-corpuscles 12 x 15 microns in diameter.

The patient was kept in bed, had a good diet, was put out of doors every day, and given arsenic and iron. She improved with great rapidity, gaining in weight and in strength.

A very careful study of the blood was made in this case by Miss Reed, and counts were taken twice a week. On November 10th the following: Hæmoglobin, 55 per cent.; red blood-corpuscles, 3,120,000; leucocytes, 4500. No nucleated red blood-corpuscles were seen. The most remarkable change was in the reduction of the size of the spleen, the edge of which was now felt 5 cm. from the middle line. She had increased in strength, her color was good, and she had gained thirteen pounds in weight.

The patient was discharged November 20th. The hæmoglobin was 54 per cent.; red blood-corpuscles, 3,680,000; white blood-corpuscles, 4300.

CASE XIV. *Enlarged spleen; anœmia of chlorotic type; recurring attacks of hœmaturia; melanoderma; diarrhœa.*—E. W. S., aged thirty-five years, lawyer, of West Virginia, seen with Dr. Thayer and admitted to Ward C, October 31, 1899.

His family history was good. When fifteen years old he had typhoid fever, and following it a great deal of rheumatism. At eighteen he had a primary sore, followed by pharyngitis and skin rash. He was very thoroughly treated. He is married and has three healthy children.

Until five years ago he was well. In the summer of 1894 he had an attack of diarrhœa, which lasted on and off for several weeks, and at this time he first noticed a sallowness of the complexion, and he had itching of the skin. In the following summer he had a return of the diarrhœa, but less intense, but with it the itching of the skin returned. He does not think that he was jaundiced. In the summer of 1896, while electioneering, the diarrhœa returned, and persisted on and off through the winter and spring, and through the summer of 1897. Then, until July, 1898, he was quite free from it. He then had it for nearly four months. Last winter he was well until March, when the old trouble began, and since then he has lost forty pounds in weight. During these five years the movements have always been the same, watery at first, followed by much mucus, and at the end of the movement a little fresh blood. Parasites have been carefully looked for by Dr. Thayer on several occasions.

In the intervals between the attacks of diarrhœa he regained strength quickly. The sallowness year by year became more marked. During the past summer for the first time he had three attacks of hæmaturia, each one followed by colic; no rigor; no fever. He was considered to have malaria, and given quinine. He had no hemorrhages from the stomach or bowels. He has never lived in a malarial region; has never had a chill. He had taken much arsenic during his illness.

Blood. Hæmoglobin, 55 per cent.; red blood-corpuscles, 3,856,000; white blood-corpuscles, 4500. Differential count: Polymorphonuclears, 73.7; small mononuclears, 14; large mononuclears, 8; transitionals, 3.3; eosinophiles, 1. No nucleated reds, no myelocytes. In the fresh specimen the red blood-corpuscles looked rather pale, slight poikilocytosis, numerous endoglobular degenerations; no malarial parasites.

The pigmentation of the skin was fairly uniform on the face. On the trunk it was deepest in the groins and flanks, the folds of the arms and in the axilla. There was some roughness of the skin and ankles; no nodes.

Abdomen. A prominent mass below the left costal margin descended with inspiration, reaching almost to the navel. On palpation this corresponded to a greatly enlarged spleen. The notch was not very distinct. The splenic dulness began at the upper border of the seventh rib. There was no enlargement of the lymph-glands. The liver was slightly enlarged. In the parasternal line it could be felt 6 cm. below the costal border. The edge could be felt. He had had no pain in either liver or spleen. The heart and lungs showed no special signs. The stools contained fatty débris and a few small blood clots; no parasites. There was no fever.

The patient remained in the hospital until November 23d. He was out of doors, in bed, all day, and improved rapidly. The diarrhœa stopped; he took his food, and seemed very comfortable.

On November 16th: hæmoglobin, 60 per cent.; red blood-corpuscles, 3,692,000; white blood-corpuscles, 3500 per c.mm. The spleen seemed to have reduced somewhat in size.

On November 19th he had an attack of hæmaturia which continued for nearly thirty-six hours; no pain. He passed several long clots. On the morning of November 21st the urine was perfectly clear.

The patient left on the 22d. There was no essential change in the condition of the blood. The hæmoglobin was between 55 and 60 per cent. No nucleated red blood-corpuscles were seen at any time. A portion of skin was excised in this case. The pigment was distributed in the cells of the corium and in the subcutaneous tissue. It gave no iron reaction.

CASE XV. *Recurring hemorrhages from the stomach in* 1891 *and* 1892; *some abdominal pain; enlarged spleen; anæmia.*—John F., Pennsylvania farmer, aged forty-three years, was seen on November 18, 1899, complaining of pains and uneasy sensations in the abdomen. He was at the hospital on October 8, 1895.

His family history was good. His personal history was excellent. He had had typhoid fever twenty years ago. He was a temperate man; said that he did not drink at all. Has not had syphilis. He has had psoriasis from his eighteenth year. He had fever and ague in 1885 when in Ohio. For two or three years he has had dyspepsia.

About Christmas, 1891, he vomited a large quantity of blood, as much as half a gallon. On January 1, 1892, he had a second hemorrhage, again bringing up about half a gallon. These attacks left him very anæmic and exhausted. In August, 1892, he had two profuse hemorrhages from the stomach, six days apart. At that time a lump was noticed in the abdomen.

At his first visit, in 1895, he was examined by Dr. Thayer, who found a spleen which reached 10 cm. below the costal margin, and in which two notches could be felt. The liver-dulness began on the seventh rib, and the vertical area seemed reduced. The border of the liver could be felt below the costal margin.

November 18, 1899. The patient returned to-day for the first time. He has remained in good condition, has never had any return of the hemorrhages, but has had more or less uneasiness in the abdomen, sometimes pain in the left side. He was robust, well nourished, looked a little pale. The abdomen was protuberant. There was no pigmentation of the skin. On examination the left side of the abdomen looked prominent, and on palpation the spleen was felt extending into the umbilical region, to within an inch of the navel, and below reaching nearly to the crest of the ilium. The notches could be plainly felt. It was not painful. The liver seemed slightly reduced in volume since the first examination. The edge, which could be felt, appeared normal. The blood examination showed: Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,270,000; leucocytes, 2500. Differential count: Polymorphonuclears, 80.3; small mononuclears, 8; large mononuclears, 4; transitionals, 2; eosinophiles, 5; mastzellen, 6.

From a study of this series I find nothing to throw light on the nature or origin of the anæmia, which remains quite as obscure as in pernicious anæmia, as in the latter disease males appear to be more frequently affected than females—twelve to three in this series. With one exception all of the cases were in adults above the age of thirty-five. The youngest was a girl of eleven years. Three of the patients were above fifty years of age. Four patients had had malaria. Case IX. had chills and fever when nine years old. Only in Cases VII. and X. is this disease a possible factor, as the patients had lived all their lives in very malarial regions. Locality has nothing to do with the number of cases here reported. Only four of the patients were natives of Maryland; three came from Canada, and the others from various States. Two of the patients had had syphilis. In four dyspepsia was a special feature, and in two there had been recurring attacks of diarrhœa of great severity.

CLINICAL FEATURES. Before referring to these we may speak of one of the most interesting points brought out by this series—namely, the long duration of the affection. Samuel West, in the article on "Anæmia Splenica" in Allbutt's *System*, states that the disease is not of long duration—from six months to two years. In several of the cases the symptoms had lasted more than five years. Case V. has probably had the condition for at least twelve years, and in Case XV. the spleen was as much enlarged four years ago as it is now.

The Spleen. In all the enlargement of the spleen appears to have preceded the anæmia. The patient suffered no inconvenience from it, and, as a rule, until discovered by the physician, did not know of its existence. In one case there were recurring attacks of pain in the region of the spleen. In all the spleen was large, reaching nearly to the navel, but only in Case VII. was it of maximum size, equalling the largest spleen of leukæmia. No case presented any difficulty in the diagnosis of the character of the tumor in the abdomen.

Hemorrhages. I have already called attention to the remarkable attacks of hæmatemesis in cases of enlarged spleen, whether simple or in leukæmia.[1] In the series here reported eight had hemorrhage from the stomach, and usually after it malaria. In seven cases this was the feature for which the patients sought relief. In Case V. the hemorrhages have recurred over a period of twelve years. Watson's explanation of the hæmatemesis in enlarged spleen is probably the most correct. "The stress of the congestion is continually felt in the submucous capillary system, and the hemorrhage, which is apt in such cases to occur from the loaded membrane, receives a simple solution upon principles almost purely mechanical." The vasa brevia, passing from the fundus, which empty into the splenic vein, drain a large section of the stomach. From estimates of Mall and Krauss 40 per cent. of the blood of the splenic artery goes to the stomach, so that one may reasonably conclude that a similar percentage of blood in the splenic vein is derived from that organ. The amount of blood brought up may be enormous, and the patient may be rendered exsanguine. Only in Cases I. and III. did the fatal termination follow hemorrhage. In a majority of the cases the diagnosis of ulcer of the stomach has been made. Hæmaturia occurred in Case XIV. It was probably not connected with stone, as it never came on with colic, but on several occasions was followed by pain and the passage of moulds of the ureter. Case VII. had on several occasions purpuric attacks.

---

[1] Canada Medical and Surgical Journal, vol. xi., and Edinburgh Medical Journal, May, 1899.

Ascites, which was present in three cases, may be due, as in leukæmia, directly to the enlarged spleen, or it may be in part associated with the anæmia. It is important to bear in mind that ascites does not necessarily indicate cirrhosis of the liver. In Case IX. the patient had three severe attacks of ascites, and the liver at autopsy showed no trace of cirrhosis.

Lymphatic Glands.. In no case in the series were the external lymphatic glands specially enlarged.

Anœmia. The patient may present only a very slight pallor, but there may be all grades of anæmia to a form as intense as that met with in progressive pernicious anæmia (Case XIII.). At least one-half of the patients when they came under observation did not present the objective features of a very profound anæmia. One of the most striking features on first inspection was the melanoderma, which was present in six cases. In Case VII. the pigmentation was as dark as in the most advanced cases of Addison's disease. In Case XIV. a portion of the skin was examined and showed none of the ochre-brown pigment of hæmachromatosis. In some of the cases the pigmentation may have been arsenical.

Blood. The following are the most striking features of the blood in this series:

1. The relatively high blood count: Of the fourteen cases the corpuscles ranged above 4,000,000 per c.mm. in six cases; between three and four millions in three; under three millions in four, and below one million in only one case. The average blood count of the fourteen cases was 3,336,357 red blood-corpuscles per cm.

2. The relatively low hæmoglobin: The estimate was not made in four cases; in the remaining eleven the ratio of hæmoglobin to corpuscular richness was low. In Case XIII. the hæmoglobin was 23 per cent., with the corpuscles above 30 per cent.; and in Case IV. the hæmoglobin was 25 per cent., with corpuscles at 60 per cent. Of the six counts in which the corpuscles were above four millions (80 per cent.) the hæmoglobin was 45 per cent. in three, 30 in one, 55 in one, and 60 per cent. in one.

3. The low leucocyte count: Of the thirteen cases in which the leucocytes were estimated there were nine with white blood-corpuscles

below 5000 per c.mm. In six cases extreme leukopenia existed. In one case the count was 12,497.

The following table gives the result of the blood examinations in the series:

Case I.—Hæmoglobin, — per cent.; red blood-corpuscles, 2,000,000; white blood-corpuscles, —.

Case II.—Hæmoglobin, — per cent.; red blood-corpuscles, 2,250,000; white blood-corpuscles, 7120.

Case III.—No count.

Case IV.—Hæmoglobin, 25 per cent.; red blood-corpuscles, 3,000,000; white blood-corpuscles, 2800.

Case V.—Hæmoglobin, 30 per cent.; red blood-corpuscles, 4,000,000; white blood-corpuscles, 6500.

Case VI.—Hæmoglobin, — per cent.; red blood-corpuscles, 2,187,000; white blood-corpuscles, 12,497.

Case VII.—Hæmoglobin, 55 per cent.; red blood-corpuscles, 4,816,000; white blood-corpuscles, 5000.

Case VIII.—Hæmoglobin, 60 per cent.; red blood-corpuscles, 3,600,000; white blood-corpuscles, 3000.

Case IX.—Hæmoglobin, 60 per cent.; red blood-corpuscles, 4,788,000; white blood-corpuscles, 5200.

Case X.—Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,128,000; white blood-corpuscles, 2800.

Case XI.—Hæmoglobin, 37 per cent.; red blood-corpuscles, 2,500,000; white blood-corpuscles, 3000.

Case XII.—Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,208,000; white blood-corpuscles, 4000.

Case XIII.—Hæmoglobin, 23 per cent.; red blood-corpuscles, 1,540,000; white blood-corpuscles, 3300.

Case XIV.—Hæmoglobin, 55 per cent.; red blood-corpuscles, 3,856,000; white blood-corpuscles, 4500.

Case XV.—Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,270,000; white blood-corpuscles, 2500.

Some additional points may be referred to.

Red Blood-corpuscles. Poikilocytosis was present in five cases. Marked endoglobular degeneration was noted in two cases. Nucleated red blood-corpuscles were met with in two cases; in Case XIII. in enormous numbers, both normoblasts and megaloblasts.

White Blood-corpuscles. As already mentioned, marked leukopenia was present in six cases. Differential counts of the leucocytes were made in ten of the cases. In the following cases there were changes in the proportion of the large and small mononuclears; in Case VII. the large mononuclears were more numerous than the small; in Case VIII. the small mononuclears were 25 per cent.; in Case IX. the small mononuclears were very high, 52 per cent.; in Case XIII. the small mononuclears were 19 per cent.; in Case XIV. the small mononuclears were 14 per cent. Altogether there was nothing in the differential count of any special moment or significance.

Diagnosis. I have considered in this series only cases which presented idiopathic enlargement of the spleen (primitive splenomegaly) with anæmia and without enlargement of the lymph-glands. In this locality enlargement of the spleen from malaria is exceedingly common, and it will be noted that there is no case included which could be called paludal cachexia. I have not included a few cases of idiopathic enlargement of the spleen in persons who appeared perfectly healthy and in whom this was found accidentally, or in whom the organ was enlarged and dislocated. Two cases presenting this latter condition have been operated upon by my colleague—Halsted—who packed the spleen into position with gauze. Both were seen more than two years subsequent to the operation, and had remained perfectly well. In a third case, a young woman with an enlarged and floating spleen had a twist of the pedicle with necrosis of the organ and intense splenitis. Dr. Halsted operated, scraped out a large quantity of necrotic material, and she made a good recovery.

The following conditions are those in which there has been in my experience a difficulty in the differential diagnosis.

(*a*) From *pernicious anæmia.* In Case XIII., for example, in which the spleen was very large, reaching to the navel, there were three points very suggestive of pernicious anæmia—namely, the very low blood count, the extraordinary number of nucleated red blood-corpuscles, and the remarkable way in which the blood improved and the spleen reduced in size under the use of arsenic, iron, good food, and fresh air. While sometimes a little enlarged, the spleen in pernicious anæmia is more commonly small, and I do not remember ever to have seen it so large as in Case XIII. A relatively low hæmoglobin percentage is rare in this disease. Another case, in which there was a doubt, was a Mr. C., aged sixty-one years, admitted July 6, 1892. He had a profound anæmia (under 1,000,000 per c.mm.), and the spleen was three fingerbreadths below the costal margin. He had at first a slight leucocytosis and a remarkable increase in the number of lymphocytes, without any special sign of lymphadenitis. Two weeks before his death the condition changed from one of anæmia to that of leukæmia, and in a count of 1000 leucocytes there were 841 lymphocytes.[1] This was probably an anomalous case of leukæmia. It was very thoroughly studied by Dr. Thayer and Dr. Barker, who will subsequently publish the case in detail.

(*b*) From certain cases of *splenic leukæmia.* There are cases of splenic leukæmia in which the leucocytes gradually diminish and remain at the normal number for protracted periods. In my text-book I give a chart of a case, in which, from February 6th to the end of April, the leukæmia had disappeared. For the greater part of the time there was leukopenia. The myelocytes, however, were still present, and from them a suggestive diagnosis, at least, might have been made. Bennet also refers to a case of this kind in his clinical lectures.

---

[1] Such cases are exceedingly rare.

A very remarkable case came under observation in September, 1898. The patient at the time presented the features of a splenic anæmia, while a few months previously leukæmia had been diagnosed. As the case will be reported in full by Dr. McCrae, I shall give only the briefest abstract. Man, aged twenty-eight years, never very strong, but of good habits; no malaria or lues. He came complaining of weakness and of swelling of the abdomen. During the summer he had been under the care of Dr. Lichty, who had diagnosed a splenomyelogenous leukæmia. The hæmoglobin was 45 per cent., the reds about 50 per cent., and the leucocytes 1 to 4. He had improved very rapidly, and when he first came under our observation the leucocytes were only 9250 per c.mm. The spleen was greatly reduced in size, and there were no nucleated reds, no myelocytes. Fortunately, Dr. Lichty had kept slides, which he was kind enough to send us. The blood was that of an ordinary splenomyelogenous leukæmia. The patient was under observation again in April, 1899, and the leucocytes were only 5000 per c.mm.; hæmoglobin, 70 per cent.; red blood-corpuscles above 5,000,000.

(*c*) From cases of *Hodgkin's disease with enlarged spleen.* There is no warrant for the opinion that these cases of anæmia splenica have anything to do with Hodgkin's disease (anæmia lymphatica) from which the clinical picture is very different. Slight enlargement of the spleen is common enough in Hodgkin's disease, but it rarely attains a large size, and I do not remember an instance in which it caused, *per se*, special symptoms.

In not one of the series of cases of which I have notes have the lymphatic glands been enlarged at any stage of the disease. So, also, in splenomyelogenous leukæmia there is rarely any great enlargement of the lymph-glands. In an interesting case, seen recently, the spleen and lymph-glands were enlarged without any anæmia or leukæmia.

William W., aged sixty-four years, referred to me by Dr. Wolfe, of Roanoke, November 13, 1899, complaining of pain in the side and swelling of the lymph-glands. He had not had syphilis; no malaria; was a very moderate drinker. He was a very healthy, robust-looking man for his age. There was general enlargement of all the external lymphatic glands; in the neck they were as large as hazel-nuts. The inguinal groups were uniformly enlarged, as big as cherries; the epitrochlears slightly enlarged. The spleen was three finger-breadths below the costal margin; the edge and the notch were easily felt. The edge of the liver could be felt below the costal margin. It was not specially firm nor painful. The inguinal glands above Poupart's ligament were enlarged. He had had no fever, no sweating. The red blood-corpuscles were 5,500,000, the leucocytes 10,000, hæmoglobin 87 per cent. The differential count by Dr. Thayer of the leucocytes showed a normal relation of the different forms.

(*d*) From *cirrhosis of the liver with enlarged spleen.* Banti has described cases with a triple combination of anæmia, enlarged spleen, and cirrhotic liver. Some of these cases he thinks represent the terminal stage of a splenic anæmia. From the history of recurring attacks of ascites, in Case IX. I thought it possible that the liver was cirrhotic, but the autopsy showed that it was normal. In Case XV., though the patient had been a temperate man, he had a reduced area of liver-dulness, and when we examined him in November, 1899, we might have laid some stress upon this had not the same condition been noted by Dr. Thayer four years previously, and it is not likely that he would have enjoyed continuous good health and to-day show no signs of trouble with a progressive cirrhosis of the liver. I have no personal knowledge of the interesting condition described by Banti.

There are three varieties of cirrhosis of the liver with which enormous enlargement of the spleen may be associated, and which may lead to doubt in diagnosis.

(*a*) *Alcoholic cirrhosis.* In long-standing cases the spleen may be enormously enlarged, and if ascites be present, or there have been recurrent hemorrhages, the clinical picture is very like that of primary splenic anæmia. The history, the facies, the more moderate enlargement of the spleen, and the whole course of the disease should enable one to make a diagnosis.

(*b*) *Syphilitic cirrhosis.* Enormous enlargement of the spleen may be secondary to gummous hepatitis, and in children with congenital syphilis this may cause difficulty in diagnosis. The history, the irregularity of the liver, and the more moderate enlargement of the spleen would be the important point. Illustrating the association of anæmia with enlarged spleen in syphilitic liver, there was admitted to my ward in 1891 a girl, aged twenty-three years, with signs of hereditary syphilis. She had trouble in the abdomen eight years ago, since which time it had been enlarged. She had a chronic pleurisy on the right side. When admitted she had fever—temperature 103°. The abdomen was greatly enlarged, and the whole of the left side was occupied by a greatly enlarged spleen. The right epigastric and upper umbilical regions were occupied by a second firm, irregular mass. There was slight enlargement of the lymph-glands. The blood showed: red blood-corpuscles, 2,234,000 per c.mm.; leucocytes greatly increased; a ratio of 1 to 25 red blood-corpuscles; hæmoglobin, 28 per cent. She died four days after admission. There was found a greatly enlarged spleen, measuring 23 x 16 cm., and weighing 1510 grammes; a syphilitic liver, much divided by fibrous bands, and necrotic gummata throughout its substance. The mesenteric and peritoneal lymph-glands were slightly enlarged. This was the largest spleen I have ever seen in cirrhosis of the liver.

Another case was that of C. A. H., aged thirty-four years, admitted December 11, 1897, with anæmia and an enormously enlarged irregular spleen. He had been a very heavy drinker; had a well-marked history of syphilis. Jaundice when seventeen. Three years ago he had jaundice and dropsy, which gradually disappeared. Eighteen months ago he noticed the mass in the left side of the abdomen, and he has gradually been becoming anæmic. Blood on admission: Hæmoglobin, 28 per cent.; red blood-corpuscles, 1,400,000; leucocytes, 7500 per c.mm. The spleen was enormously enlarged and irregular, and the liver could also be felt as an extremely irregular mass in the right hypochondrium. He had several attacks of colic while in the hospital, and was jaundiced. He improved very much, the spleen diminished in size, and he left the hospital with the hæmoglobin at 65 per cent., red blood-corpuscles 3,000,000, leucocytes 8370. In this case the history of syphilis, the previous attack of jaundice, and the irregular condition of the liver left no question, I think, as to the presence of syphilitic hepatitis with secondary enlargement of the spleen.

(c) *Hypertrophic cirrhosis.* Hæmachromatosis, that remarkable condition of hypertrophic cirrhosis with melanoderma, enlarged spleen, and diabetes as a terminal phenomenon, may simulate anæmia splenica. The spleen may be very large, and in the later stages ascites and hemorrhages have been noted. Anæmia is not often present, and in two early cases which I have examined the blood count was normal. In young persons there is a non-alcoholic hypertrophic cirrhosis of the liver, with very great enlargement of the spleen, in which, when anæmia exists, it might be difficult to reach a diagnosis. In not one of the fifteen cases here recorded was the liver greatly enlarged.

Doubt has been expressed as to the existence of a separate and distinct disease to which the term splenic anæmia should be given. We do not know whether the anæmia is the result of the enlarged spleen, or whether, as seems more probable, both are secondary to some cause as yet unknown. Provisionally, until we have fuller knowledge, it is useful to group together, as I have done here, cases of idiopathic enlargement of the spleen with anæmia and without lymphatic involvement, and to label the condition splenic anæmia. There are borderland cases difficult to classify, but, on the whole, the composite picture, as obtained by grouping the fifteen cases here recorded, has tolerably definite outlines.

The treatment is that of the severe types of anæmia. Case XIII.

illustrates how rapidly improvement may follow under iron, arsenic, sunshine, and good food. In the chronic cases with recurring hemorrhages the question of removal of the spleen should be considered. It was successfully carried out in Case IV., and the patient has remained well for more than a year.

A CRITICAL SUMMARY OF RECENT LITERATURE

ON

GONORRHŒA IN WOMEN.

By John G. Clark, M.D.,
PROFESSOR OF GYNECOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

Among the investigators who have studied the many phases of gonorrhœa in women, none have been greater epoch-makers, outside of Neisser, the discoverer of the gonococcus, than the Swiss gynecologist, Bumm, of Basel.

His practical and scientific investigations, which have been published from time to time, have been of the highest standard; and in a recent article (*Veit's Handbuch der Gynäk.*, Band i.) he has given a logical review and criticism of the work of other writers, from which he has selected the salient points, and has combined them with his own original research in a very interesting and instructive way.

His view of the origin of the gonococcus is especially interesting, for he claims that it, like other micro-organisms in their evolution, have acquired specific functions, and that possibly, sooner or later, by modified culture methods it may be possible to rob this organism of its specific character and reduce it to the grade of a simple non-specific pus producer.

That the gonococcus has not recently acquired its specific characteristics is certainly true, for we have ample evidence that not only the Greeks and Romans, but also the ancient Egyptians and Israelites suffered with this disease.

Bumm has proved by carrying one culture of gonococcus through medium after medium that a point is finally reached at which its specific character is so slight that only a very fleeting and mild case of gonorrhœa can be induced through its inoculation.

In its artificial propagation the gonococcus is very capricious, requiring especially prepared culture media and careful regulation of extraneous conditions to promote its growth, while upon the mucosa of the genito-urinary tracts it thrives most luxuriantly.

Why this difference no one has yet definitely explained.

While, as Bumm says, the gonococcus may to some extent be deprived of its virulence through successive cultures, it does not naturally occur in the human individual, for it is a well-known fact that many of the worst cases of ophthalmia neonatorum are derived from mothers who to all appearances may have entirely recovered many years previously from an attack of gonorrhœa. Cocci which have apparently lain dormant in the tissues months or years thus appear to spring into new life through the favoring influences of the pregnant state.

In the same way a man and woman similarly infected may continue to hold sexual relations without a renewal of the acute process, a simply subacute condition being all that remains of the primary infection. If, however, one of these individuals has intercourse with a third person, the latter may acquire a most virulent attack. So far these culture peculiarities have not been explained. In biologic evolution in general the moment advantageous environments are changed organized individuals usually tend to revert to a primitive type. This, however, does not appear true with regard to this organism, for although its environments may be so changed as largely to deprive it of its specific properties, the moment proper conditions are offered it immediately manifests all of its former virulence. Again, it shows the greatest persistence in its growth in living tissues, and we may almost agree with the principle established by Noeggerath, "once infected always infected."

While the general bacteriological law of Wissakovitsch, which holds that so long as the cells covering any part of the body preserve their integrity the underlying tissues will be preserved from infection, may be true in relationship to the pyogenic organisms, a diametrically opposite effect is noted with regard to the action of the gonococcus, for while it does not appear capable of penetrating the horny layers of the skin, it finds the mucous membrane most vulnerable. Its incredible rapidity of growth also makes it a very infectious organism, for a large number are not necessary to induce infection, a few cocci being capable of generating within a short time myriads of others.

As to an acquired immunity, Bumm, with many others, claims that this is not possible, for many cases have been reported which prove conclusively that a man just recovered from an acute infection may become reinfected immediately by an impure sexual congress.

In the pre-bacteriological era it was thought that with the cessation of the purulent discharge its specificity also disappeared; culture specimens, however, show that this is not true, for the glairy mucus discharge of chronic gleet may be so potent as to transmit a virulent attack of gonorrhœa to another.

Noeggerath was the first to demonstrate the chronic or persistent course of gonorrhœa, and upon his observations he made the rather sweeping statement that gonorrhœa in women as well as in men is, as a rule, a lifetime affliction.

Bumm denies this statement, and says that a large number of cases—what proportion he does not venture to say—terminate in complete recovery. In other instances the discharge is persistent, remaining as a whitish, slimy secretion, which may be so scant as to be noted in the male only as a small drop upon rising in the morning or only after an excess in " venere et baccho."

Whether such a discharge is capable of inoculation can only be determined by cultures and microscopical examination of the secretions. Upon this point Neisser, the discoverer of the gonococcus, and Behrens, the chief examiner of prostitutes in Berlin, have entered into a very acrimonious controversy, the latter claiming that the microscopical examination is practically worthless, whereas the former insists upon its certain utility.

I am disposed to take sides with Neisser, for I feel assured that repeated examinations by a skilled observer will sooner or later reveal the specific organism.

To depend, however, upon establishing this point by one examination is certainly untrustworthy, for it is frequently only after close study of many well-stained cover-slips that gonococci are found.

As a working rule, one may say that in men with a chronic discharge, be it even of mild degree or insignificant in amount, gonorrhœa is present.

Such men are frequently misled by their physicians, and, fearing no danger of transmission, marry, and thus many innocent women become chronic invalids, or even lose their lives through this ignorance.

The primary points of infection in women depend upon many circumstances. In young women in whom the vagina is more or less virginal in character, the parts most likely to be infected are the external organs, especially the urethra. In women with very much relaxed structures the vaginal vault and cervix are natural points of election. The tendency of gonorrhœal infection in women is to become chronic, and while the patient herself may not suffer from appreciable lesions, nevertheless a sufficient number of gonococci are present to transmit the infection, for, as has been stated above, a few organisms may induce just as virulent an attack as myriads, on account of their almost incredible rate of multiplication. On account of the persistence of this disease in the female individual, questions concerning the fidelity of married women who may reinfect their husbands may arise. Bearing upon this point, Bumm relates an instance in which the first steps in a divorce procedure had been instituted when he saw the case. The man had married six months subsequent to a rapidly-healed acute attack of gonorrhœa, and, as is so often the case, the marital relations of the newly-wedded pair caused a lighting up of the concealed infection in the man, and his wife became infected. Conception quickly followed the marriage, and after the birth of the child the woman, on account of ill health resulting from her specific infection, was sent to a health resort, where she remained for some time. The husband in the meantime had fallen sick from pleurisy, which confined him to bed for three months.

On resuming sexual relations the man became reinfected, and at once accused his wife of infidelity, and instituted proceedings for a divorce.

In this case the woman was most unjustly accused by her husband, for she had only given back the infection which she had received from him during their honeymoon.

Outside of sexual intercourse gonorrhœal infection may be transmitted in many ways. Thus it is not uncommon for young children who sleep with infected nurses to acquire this disease. Epidemics which have arisen in a similar way in foundling and orphan asylums are also well known. Unclean instrumental manipulations in catheterization, examination, or in the use of the douche have not infrequently been the means of transmitting an infection from one person to another.

To avoid such a possibility as this, I make it a rule to always have separate vaseline jars for each examination, for I am certain that the routine use of one, as is so often practised by physicians in their examinations, may be a prolific source of infection.

For the same reason especial caution should be observed in making a rectal examination after contact with the infected vagina, for in this way a virulent attack of gonorrhœa may be carried from one passage to another. Concerning the period of incubation, Bumm has found through recent culture experiments that even within twelve hours after the introduction of active organisms into the genito-urinary tract signs of inflammation become manifest, and after twenty-four more hours the attack is well established.

The many variations in the clinical incubation period which are noted may depend upon a variety of conditions, such as the virulence of the organism, the nature of the culture ground, and as to whether or not the gonococcus remains undisturbed in one spot.

In women it is especially difficult to know definitely when the first symptoms appear, for a simple leucorrhœal discharge is such a common event with them that they may overlook for many days even a profuse gonorrhœal discharge without attaching any significance to it. If the time established by Bumm by experimental means is taken as a guide, it is possible that under favorable conditions the infection may become evident within forty-eight hours.

This observation, however, is at variance with the usual clinical rule, of five to seven days, but in the latter case we must take into consideration the variation of virulence, the varying conditions of growth, etc., from those accurately controlled in Bumm's experiment.

Pathological Anatomy. Bumm gives the most logical and vivid description of the pathological changes induced in the tissues through the presence of the gonococcus, which is worthy of the most careful study, for it clears up many disputed points concerning the symptoms, prognosis, and especially the treatment of this disease. As a cardinal statement, he says that gonorrhœa is essentially a disease of the epithelial layers, and does not pass beyond this boundary. In the incubation stage the moment gonococci are deposited upon the mucosa they begin to multiply with their characteristic rapidity, and adhere very closely to their primary location. In their further growth they begin to penetrate between the epithelial layers, which at once excites a most remarkable transmigration of leucocytes to the irritated areas. As the disease progresses the epithelium becomes more or less disorganized, in some places being lifted up from its base, in others cast off in large flakes. At this stage myriads of leucocytes are found beneath the epithelium and upon the surface as a copious purulent discharge.

As the epithelium is shed the gonococci begin rapidly to disappear, for, as Bumm states, their further penetration of the tissues is limited by the substratum of connective tissue. Consequently, in general, gonorrhœa may be considered a self-limiting disease.

This statement requires some explanation, for although the exposed surfaces of the mucosa may be free from gonococci there are still isolated areas, especially in chronic cases, in which many colonies appear to be segregated. Sections from these points show either a thick epithelial layer, richly infiltrated with leucocytes and with superficial colonies of micro-organisms, over which there is still a thin layer of epithelium, or the stratum consists of one or at most a few layers of flat epithelium, which hold superficial colonies of gonococci.

In his description of gonorrhœa of the vulva, vagina, and vaginal portion of the cervix which are covered by simple pavement epithelium and not, as usually supposed, by mucous membrane, Bumm throws much light upon the well-known resistance of these parts to infection when compared with true mucosa. Thus it is a well-known clinical fact that a woman may suffer with gonorrhœa of the urethra and cervix while the vagina and vulva remain intact. From the pathological stand-point this clinical immunity is easily explained, for the gonococci penetrate only with great difficulty between the layers of flat epithelium, whereas the cylindrical epithelium of true mucosa is very vulnerable. An exception to this rule is noted in young children who are especially susceptible to infections of the vagina. This is attributable to the anatomical fact that the epithelium, which lies within the tightly closed vulvar orifice, is very delicate, and naturally the gonococci much more easily penetrate between its layers than in the adult. The same rule holds good in senile cases, where the epithelial layer becomes very thin and delicate through atrophy, and consequently is easily infected.

Notwithstanding the destruction of the epithelial structures a very rapid regeneration takes place as soon as the gonococci with the epithelial débris are cast off.

Contrary to the opinion which I have previously held, Bumm states that when Bartholin's glands become the seat of gonorrhœa the main efferent duct is usually the only point of infection. Jadassohn claims that immunity of the terminal acini of this gland is due to the germicidal action of its secretion.

An especial peculiarity of the gonorrhœal process in Bartholin's gland is that the duct frequently becomes occluded, and through gradual obstruction is converted into a pseudo-abscess.

The lining epithelium remains more or less intact, and the acini may show no trace of suppuration, but are simply pushed back into the underlying connective tissue.

In his further consideration of the changes in Bartholin's gland Bumm explains the difference in the lesions noted in an infection induced by gonococci and that of the ordinary pyogenic organisms which is most satisfactory, for it clears up the statement made above, to the effect that the occlusion of the Bartholin's duct in gonorrhœa leads to the formation of a purulent retention cyst (pseudo-abscess) rather than to a true abscess, which is frequently noted in these cases.

The purulent accumulations found in Bartholin's gland frequently become chronic abscesses, which burrow out into the many acini and lead to a more or less extensive destruction of the adenoid and adjacent connective tissues.

This, according to Bumm, is attributable to the fact that a pyogenic infection is superimposed upon the gonorrhœal process, and thus leads to the formation of a true abscess. The pathological process under these circumstances is similar to that induced in the breasts by the pyogenic organisms, which travel along the connective tissue stroma of the acini, and may lead to a partial or total destruction of the entire gland.

In an infected Bartholin's gland which had been extirpated, Bumm was able to demonstrate in the acini all stages of infection, from a simple primary irritation to extensive suppuration.

Some acini existed as localized abscesses, in others a luxuriant granulation tissue had taken the place of the epithelial lining, while in others a complete cicatricial obliteration of the acini was noted.

In this case, notwithstanding the abscess had formed during an acute gonorrhœa, only the staphylococcus aureus was found. Evidently the gonococci had simply prepared the way for the latter organism.

Incidentally, I may remark that this explanation accords perfectly with our clinical observations. In some instances the evacuation of the abscess is promptly followed by complete healing and a restoration of Bartholin's gland to the normal. Such cases are manifestly purulent retention cysts or pseudo-abscesses.

In other cases the evacuation of the first abscess is quickly followed by others in succession, which run on indefinitely until a veritable crop is formed, and only after complete extirpation of the gland is the healing complete.

These are cases of ordinary pyogenic infection in which one or more acini after another are progressively infected.

In the study of gonorrhœal infection of the uterus, Wertheim was the first to give a definite description of the pathological changes. He found the gonococci situated upon the surface of the mucosa, and from thence penetrating between the columnar epithelial cells, where masses of them had propagated. In the deeper layers, however, he was unable to find any gonococci, and likewise in the stratified cervical epithelium, although the mucosa of the fundus was thickly studded with colonies. The chief changes in the mucosa consisted in an enormous leucocytic and round-celled infiltration of the interglandular tissue. Beside these changes, in 50 per cent. of his cases there was a typical endometritis glandularis with luxuriant growth of the glands. Associated with these changes of the mucosa a rich round-celled infiltration of the muscular tissues was frequently noted.

Although Wertheim was able to find gonococci only in the superficial layers of the mucosa, he thought it quite probable that they might also be present in the inflamed muscular tissue.

Madlener also believed that he observed gonococci throughout the uterine muscle in a relatively acute case of uterine gonorrhœa, where there were numerous interstitial abscesses. Bumm, who has seen the same sections, states, however, that he was not able to confirm Madlener's observations.

According to Bumm, the pathological process in the cervical mucosa is identical with the description given above. In only one case has he seen a cervical gland infected. This was converted into a purulent Nabothian follicle which contained typical gonococci. In no case has he seen the gonorrhœal process penetrating deeply into the laminæ of the glands, being almost invariably superficial in character.

Even in cases of chronic gonorrhœa Bumm still found the lesions superficial, and in the muscular tissue nothing further than a round-cell infiltration was noted.

The least changes were noted in the mucosa of the cervical canal. The glands were intact in all cases, and in many areas the typical palisadel arrangement of the cylindrical epithelium was preserved, individual cells being frequently provided with their cilia. Along the inner epithelial border a more or less extensive round-celled infiltration was noted in these cases.

In order to find the gonococci it was frequently necessary to search for a considerable distance along the mucosa. Wherever the cylindrical cells were present gonococci were never found, but in those areas in which they were replaced by one or more layers of flat epithelium colonies of gonococci were usually noted, which either occupied a superficial point or penetrated only very slightly between the cells and never reached the connective tissue substratum.

In the mucosa of the fundus Bumm finds exactly the same tendency for the gonorrhœal process to maintain only a superficial position, neither involving the glands deeply nor reaching the connective tissue substratum.

The epithelium of the infected areas consists of one or more layers of flat instead of the normal cylindrical cells.

In opposition to the statement of some writers that the muscular tissue may be invaded by gonococci, Bumm states most positively that only the superficial portion of the mucosa is affected, and that the deeper round-cell infiltration is due to a simple inflammation and not to the actual presence of gonococci.

Concerning gonorrhœa of the Fallopian tube, Bumm feels assured from his cases that the pathological process is identical with that in other mucous membranes, and that the case of Wertheim, the only one reported in which gonococci were found in the wall, is one of the rarest exceptions—in fact, he feels that even this case may be one in which rupture of a pyosalpinx into the parometrial connective tissue had occurred.

Through the escape of pus from the fimbriated extremity of the tube the ovary may become secondarily infected, and as a result an extensive perioophoritis may occur, which leads to its more or less complete encapsulation with adhesions.

A follicle or corpus luteum may likewise become infected, and lead to the formation of an ovarian abscess. In two such cases Wertheim has found gonococci.

As a further result of the escape of pus into the abdominal cavity, the adjacent peritoneal surfaces likewise become secondarily inflamed.

While gonococci may exist for a time upon the peritoneum, it is quite certain that at best it is a very poor culture ground, and Bumm believes a general peritonitis cannot occur from this source. Concerning this point, however, I may say that cases have lately been reported by Cushing which would seem to disprove Bumm's opinion, for in two instances he was convinced that the gonococcus was the primary cause of a general peritonitis.

Concerning the rôle of the gonococcus in the production of suppuration, at least in the deeper lying tissue beneath the mucosa, Bumm is somewhat skeptical, although he does not deny the possibility. He holds, however, firmly to the belief that many cases are due not to the gonococcus, but to a mixed infection, just as he has described in Bartholin's gland.

Concerning the healing process in gonorrhœa, Bumm believes that, notwithstanding the fact that the pus cells are crowded with gonococci, the leucocytes do not have a phagocytic action, but, on the contrary, furnish a splendid culture ground. In other words, the gonococcus seeks the leucocyte by preference as a culture ground rather than that the latter is there as a destroyer of the organism.

As an explanation for the healing, Bumm believes that the regenerated epithelial cells acquire an immunity through which they are able to resist the further invasion of the gonococci.

This acquired immunity lasts only so long as the gonorrhœa is present, and is very quickly lost after recovery, and while an immunity against the gonococcus of the infected individual may be established, she is still susceptible to an acute infection from a fresh organism.

A full review of the clinical course, diagnosis, prognosis, and treatment will be continued in the next number of this JOURNAL.

REVIEWS.

GENERAL PHYSIOLOGY: AN OUTLINE OF THE SCIENCE OF LIFE. By MAX VERHORN, M.D., Ph.D. Translated and edited by FREDERIC S. LEE, Ph.D. London: Macmillan & Co., Ltd.

SUCH an important subject as general physiology is ever of interest, not only in the study of natural science, but in practical medicine as well.

"Physiology has for its task the investigation of life," says the author. The achievements and discoveries, great as they have been, have been chiefly with the gross chemical and physical phenomena of the body—the mass effects of large parts of the body and the special activities of the different parts. However brilliant these may have been, they fail to explain the *elementary* vital phenomena—the general vital problems. When we inquire into these elementary vital phenomena we are led to the cell, so that cell-physiology has before it an enormous field. It is pointed out that the reason cell-physiology has been neglected is because we do not make physiology sufficiently comparative, and the necessity of making it more comparative is strongly urged.

We cannot agree with the author in saying "the science of physiology of the organs has passed the culminating point of its development." This may be with some organs, but certainly the great progress made in the study of internal secretions in recent times, and in the investigation of the nervous system since the discovery of the neuron, does not bear this out. While it is true that the lower forms of life have not received proper attention, yet it does not follow that greater advance could have been made by first investigating the simple forms of life and then going to grosser activities and the most highly specialized tissue or organ, instead of the reverse order. Certainly our knowledge of contractility could not have been obtained from the amœba as it has been from highly specialized muscles. The same is true of irritability and other properties of protoplasm.

After showing there is no *specific* vital force, the author speaks of how the term is generally used at the present time as a special expression of chemico-physical forces, but adds: "A return to the ill-reputed word, which arouses a well-defined prejudice, is simply to give up the advantage afforded by the hard-earned conviction of the unity of cause in all nature." No suggestion of a better term is given. If we do not express those obscure complex processes of cells which are not yet understood as vital activities, what are we to call them? Certainly as the word is generally used to-day it has nothing to do with the old "vitalism."

In dealing with the composition of living substance attention is called to the frequent mistake of considering protoplasm as a chemically unitary substance, and it is further added, "our conception of protoplasm should be a comprehensive morphological and not a chemical one."

Regarding the nucleus, the same thing is true, and we are glad to see it pointed out that there are four substances quite constantly present in nuclei. Particular emphasis is laid upon the undesirability of applying the chemical term *nuclein* to the morphological constituent *chromatin* of the nucleus. There are different kinds of nucleins, and as we know so little about them, we should be very careful not to confuse chemical with structural terms, for what we extract from a great mass of cells may be quite different from what we see under the microscope. As the author states, the building of the bridge between chemistry and morphology, and particularly with the nucleus, is an extremely difficult undertaking.

After discussing the different views regarding the centrosome, he concludes that it is a special and not a general constituent of the cell, for the reasons that it is impossible to find it in many cells, especially unicellular organisms, and when present it is not known to take part in any other vital phenomena than those of fertilization and reproduction.

Concerning the ground substance of protoplasm, the view supporting the elementary granules of Altmann is shown to be untenable in a very emphatic way. This, however, does not include the changes occurring in gland cells during secretion. After considering the views formerly held regarding the finer structure of protoplasm (the active, contractile framework—spongioplasm—and the inactive fluid—hyaloplasm—held in its meshes), the author adduces arguments, and quotes the work of Berthold and Bütschli to prove that protoplasm is homogeneous and fluid in nature. It seems strange now that the view regarding spongioplasm and hyaloplasm should have remained unchallenged for so long a time. In the endeavor to get at the basis of life, biologists and histologists disregarded the change taking place with the death of the cell, and particularly the action of fixation agents. This illustrates the extreme care required in the study of cell-physiology, and recalls the warning of Flemming regarding artefacts. The homogeneous, fluid nature of protoplasm has been still more fully established through the works of Schwarz and of Fischer and the recent investigations of Hardy. In view of these researches it is, perhaps, not too much to wonder how our present ideas about the structure of the nucleus and centrosome will stand the test of such methods of investigation.

In discussing the differences between organisms and inorganic bodies the author regards metabolism as characteristic of the living organism, but says it only distinguishes living from dead organisms, and that "metabolism is not confined to organisms, but occurs also among inorganic bodies" (p. 125). An example is given of the formation of concentrated sulphuric acid by mixing nitric and sulphurous acid. The sulphurous acid withdraws one atom of oxygen from the nitric acid to form the sulphuric acid, while the nitrous acid so formed takes up oxygen from the air to form nitric acid again.

We must take issue with the use of the word metabolism for such changes in inorganic chemistry, believing that the term should be used solely to denote the obscure chemical changes that occur in protoplasm. It is true that in the example given there is a continuous change of material, a constructive and a destructive change as well as oxidation, but the change is much simpler and occurs at one bound, and does not occur gradually, with various stages, in which there is a rearrangement of atoms and radicals. The changes in the cells are so complex, so obscure, that it seems well to restrict the use of the word metabolism to these changes.

Later, in discussing the way in which enzymes act, the same example in inorganic chemistry is given again as an illustration to show how bodies may be continually altered chemically and continuously re-formed immediately, so as to appear to remain unchanged. This illustrates very well the way enzymes probably act, but does not explain metabolism.

In summarizing the discussion of living and lifeless substance it is stated (p. 136): "We may thus give expression to the problem of all physiology—*the life-process consists in the metabolism of proteids.*" It is true the possession of the proteid molecule is a definite distinction of organisms, but the *life-process* involves not only the changes in these proteids, but also the oxidation of other organic substances (fats and carbohydrates as well as handling the inorganic bodies in these processes). It is true, as is pointed out later in dealing with the mechanism of life, that the changes occurring in proteids are much more complex than the changes occurring in other organic bodies, and cannot be simulated outside the body; but the process of life includes the *entire metabolic process,* and not merely the metabolism of proteids.

The book is splendidly written, and presents so many suggestions, with a thorough discussion of vital problems treated in such a masterly way, that it is a pleasure to read a work of its kind in these days of specialism. Such a collection of facts treated in a broad and scientific way should cause the book to be read by everyone at all interested in the science of life.

The text is very fully illustrated by beautiful plates. The work of translating and editing has been most admirably performed.

W. S. C.

TREATISE ON HUMAN PHYSIOLOGY. BY HENRY C. CHAPMAN, M.D. Second edition. Philadelphia and New York: Lea Brothers & Co., 1899.

THE general plan of this work is the same as in the first edition, the author stating in his preface that, aside from the plan, the book has been recast. A very striking and disappointing feature of the work is the absence of separate chapters on metabolism and secretions—particularly internal secretions. External secretions are rather briefly treated—saliva with digestion, milk with the skin, and so on. The arrangement of giving the nervous mechanism of different functions only with the nervous system seems undesirable. As an example, the nervous mechanism of the secretion of saliva is given in the last part of the book with the cranial nerves, while no reference is made under the secretion of saliva, early in the book, to those pages. The nervous mechanism of the circulation and of respiration is likewise given with the cranial nerves. Naturally, when these subjects are fully treated in one place there must be some repetition in treating of the nervous system, but this is better than dividing the subject as in the work before us, where the student would largely lose the connection. As an example, the circulation is treated of in three different places, the nervous mechanism of the heart being given with the cranial nerves, that of the bloodvessels with the sympathetic system. As a result, the depressor nerve is disposed of before the vasomotor control of the bloodvessels has been discussed. The effect of asphyxia on the circulation is only mentioned in the chapter on Respiration. It seems a distinct disadvantage to the student to be obliged to hunt up a subject in so many different places instead of having it all presented together, even if there should be some repetition.

Regarding internal secretions, they are very meagrely treated and are scattered throughout the book—that of the liver and pancreas being given under the subject of digestion; that of the thyroid, suprarenal, and thymus with the blood; while the pituitary is considered with the nervous system. We fail to see why the thyroid or suprarenal gland should be considered with the blood, or why the internal secretion of the pancreas should be considered with the digestion, as it is so separate and distinct from the external secretion, and has to do with metabolism and not with digestion.

Concerning the internal secretion of the thyroid gland, it is stated (p. 198) that the material elaborated by the gland passing into the blood promotes the general nutrition, possibly by increasing the number of red blood-corpuscles, or by destroying some toxic substance which otherwise accumulates and causes auto-intoxication. Certainly the removal of the thyroids in dogs, causing death in a short time, does not disturb the red blood-corpuscles.

The suprarenal capsules are disposed of in half a page. It is stated (p. 197) that these glands resemble in many respects, in their intimate structure, lymphatic glands. While they do contain many lymphoid cells, yet the sharp distinction between the cortex and medulla, the many different kinds of cells in the adrenals, and the peculiar arrangement of the bloodvessels, all serve to make a sharp distinction.

To say the internal secretion of the pancreas contains a glycolytic ferment which causes splitting up of sugar before it is oxidized in the tissues is an easy way of disposing of the matter, but it does not explain pancreatic diabetes, for it has been found that the blood of dogs, after extirpation of the pancreas, still has as great a glycolytic action as before.

The handling of glycogen and the formation of urea by the liver are dealt with in the chapter on Digestion even before absorption has been considered. Neither the quantity of sugar nor of urea in the blood is mentioned. The subject does not receive the attention it should, being crowded in four pages, while it should be treated in a separate chapter on metabolism.

In the chapter on Digestion no mention is made of the way in which bile aids the action of trypsin and amylopsin. . . . Concerning the digestion of starches, this is traced to the maltose stage, but the last step (the inversion of maltose into dextrose) is not made clear. No mention is made of the enzyme *invertin* at all; indeed, doubt is expressed (pp. 132 and 133) as to whether the intestinal juice has any digestive properties whatever.

Absorption would appear from this book to be solely due to physical forces, as any vital activity of the intestinal epithelium in bringing about absorption is not mentioned. The author does not explain how fats are absorbed, nor does he explain why non-dialyzable colloids can be absorbed from the intestine, while many highly dialyzable crystalloids are not absorbed.

The action of the intestinal epithelium in converting peptones into the coagulable proteids of the blood is mentioned, but no mention is made of the conversion of different forms of fats into neutral fats.

In the chapter on Blood very slight mention of the normal variation of the white blood-cells is given. No mention is made of leucocytosis, nor is any idea given of the normal number of the different varieties of leucocytes. This matter is treated as follows: "It should be mentioned that many histologists consider leucocytes as being of three kinds, differing from each other in the manner in which they (what?) stain with acid, basic or neutral dyes, or according to the number of nuclei they contain or the amount of amœboid movements they exhibit. It is very probable, however, that the three different kinds, so-called, are only different stages of development of one kind of white corpuscle" (p. 192).

Concerning the fate of the leucocytes, it is stated that "much might be said in favor of the view that white blood-corpuscles become transformed into red corpuscles, and many facts of comparative anatomy, embryology, and pathology apparently support it. It must be admitted, however, that we do not yet know whether they are transformed to another kind of corpuscle or simply disintegrate."

The blood-plates are regarded as the nuclei of disintegrated leucocytes (p. 200).

In tracing the pathway of sensory impulses through the cord it is stated (p. 571) that fibres of the posterior roots cross the middle line of the cord, and then ascend in the anterior and antero-lateral columns, so that a hemisection of the cord in a dog causes loss of sensibility on the opposite side of the body and loss of motion on the same side. This loss of sensation is certainly not the case in the dog and cat, although in man there seems to be a greater disturbance of sensation on the side opposite to the lesion. There are so many possible routes by which afferent impulses can travel up the cord that animal experimentation teaches very little. These are not made clear, however. It is stated that sections of the columns of Goll in animals is followed by defects of co-ordination similar to that due to the loss of the cerebellum. Perhaps this was not intended to include quadrupeds. Too little space, considering the size of the book, is given to the consideration of the cerebral cortex. The relation which the motor centres of the Rolandic area bear to the lower nerve-centres in the lower animals is not made clear. The remarkable recovery which the dog makes after removal of these centres is not mentioned.

Throughout the entire book a great deal of space is taken with anatomical considerations. W. S. C.

A Manual of Venereal Diseases. By James R. Hayden, M.D., Chief of Clinic and Instructor in Venereal and Genito-Urinary Diseases at the College of Physicians and Surgeons, etc. New York and Philadelphia: Lea Brothers & Co., 1898.

We gladly welcome the second edition of Dr. Hayden's little work. It is somewhat enlarged as compared with the first edition, most of the additional material appearing in the chapter devoted to stricture of the urethra.

The first half of the book is devoted to gonorrhœa, acute and chronic, and its complications, including stricture of the urethra. We notice in the chapter dealing with the treatment of acute gonorrhœa that the author disapproves of the employment of the so-called Janet method, and states what appears to be some very strong objections to the use of this method of treatment.

We are pleased to note the space devoted to the discussion as to when a case of gonorrhœa is really cured. Too little attention has in the past been paid in text-books to this important matter. The article on stricture of the urethra is very complete and conservative, and represents the views of most genito-urinary surgeons. A very interesting chapter is the new one, introduced in this edition, upon the care of urethral instruments. In this connection we are glad to see the author call attention to the fact that it is much more important for the patient's welfare that the surgeon shall know how to pass an instrument into the urethra than it is that the instrument should be sterile from a laboratory stand-point. The use of gloves in urethral manipulations is pronounced to be an "extreme and unnecessary fad."

The last one hundred pages of the book are devoted to the discussion of syphilis, which is treated in a most comprehensive manner without being too prolix.

Dr. Hayden's little book is invaluable as a manual for medical students, and is a most excellent hand-book of reference for the busy practitioner of medicine. H. M. C.

THE MINERAL WATERS OF THE UNITED STATES AND THEIR THERAPEUTIC USES. With an Account of the Various Mineral Spring Localities, their Advantages as Health Resorts, Means of Access, etc. To which is added an Appendix on Potable Waters. By JAMES K. CROOK, A.M., M.D., Adjunct Professor of Clinical Medicine and Physical Diagnosis at the New York Post-Graduate Medical School. 8vo., pp. 588. New York and Philadelphia: Lea Brothers & Co., 1899.

A COMPREHENSIVE work on the mineral waters of the United States has long been needed. The material for such a treatise has been at hand in abundance; patients have not been lacking, and physicians have not been reluctant to advise the use of mineral springs. On the contrary, mineral spring resorts have been thronged with vast numbers of sufferers from all sorts of complaints, and it is somewhat remarkable that no large treatise descriptive of all our mineral springs has been at hand. It is true that Dr. Albert C. Peale, of the United States Geological Survey, has done a great deal to investigate our springs, and has enumerated them from time to time for the Government publications; but the therapeutics of mineral waters has been too little understood, except as practitioners at the springs have learned by experience to apply them. The present volume is a worthy companion to the work on the *Mineral Waters and Health Resorts of Europe*, by Sir Hermann Weber and Parkes Weber, recently issued, and by comparison with that work we find American waters quite as numerous and, we trust, as efficacious as those in foreign lands.

Dr. Crook's work contains 588 pages. The first eighty-three pages are devoted to a consideration of the origin and classification of mineral springs, with their modes of action and hints regarding their use; their solid and gaseous components, and their therapeutics. The springs are enumerated alphabetically by States, and in all available cases analyses are given. Interesting geographical and climatic data are incorporated with the description of the resorts, and the author has succeeded in avoiding a dry and monotonous style in dealing with hundreds of places that require description. The information given is concise and not too laudatory.

The author refers to the difficulty of finding an advertisement of a mineral water which does not include diseases of the kidneys among the troubles cured or greatly benefited by its use, and remarks that simple, pure water is a mild and harmless diuretic, and is no doubt often beneficial in renal affections. No rational medical practitioner can bring himself to believe that the mineral ingredients of an alleged mineral water containing two or three grains of solid contents to the gallon can possess a very potent influence in restoring an advanced case of Bright's disease. The author advises the light arsenical waters of Virginia for the milder cases of glycosuria, but is very conservative as to claiming any specific influence. For obesity he recommends a morning draught of one of the saline sulphated waters; also the liberal use of the saline sulphated waters and thermal baths in conjunction with proper exercise and diet. Much was formerly claimed regarding the beneficial effects of various waters in scrofula. One mineral water, according to the author, was brought before the public by the proprietor with the following modest announcement: "Scrofula embraces almost everything, and the waters of the spring herein described afford the best known remedy for scrofula." The author endeavors to adhere to facts as far as the best experience may indicate, and the practitioner will find his work a reliable guide, abounding in suggestions for the treatment of cases by a class of remedies too often misunderstood and misapplied. G. H.

TEXT-BOOK OF OPHTHALMOLOGY. By ERNEST FUCHS, M.D., Professor of Ophthalmology in the University of Vienna. Authorized translation, revised from the seventh enlarged and improved German edition. By A. DUANE, M.D., Assistant Surgeon, Ophthalmic and Aural Institute, New York. With 277 illustrations. Second American edition. New York: D. Appleton & Co., 1899.

THIS work, by far the best production of its kind from any single author in any language, has, through the labor of a most conscientious and able editor, been placed for a second time in its English dress before the American reader. Comparison of the author's seventh and last edition in its original form with the present translation has made it plainly evident to the reviewer to what degree of conformity the text of the author has been followed, while a most careful perusal of the English edition has conclusively shown that the language of the editor has been couched in such a simple and yet expressive manner as to be equally comprehensible to the mind of the teacher and the student.

We wish both the author and the editor the praise that the work as a scientific and a practical account of present progressive ophthalmology deserves, and sincerely hope that many new and increasingly useful editions may be vouchsafed them. C. A. O.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,
PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

Observations Upon the Origin of Gall-bladder Infections and upon the Experimental Formation of Gallstones.—Cushing, in referring to the case of acute suppurative cholecystitis recently reported by Hunner, says that there seems to be little doubt but that the original source of infection in these cases is a hæmatogenous one, the bacilli first entering the portal circulation through the atrium afforded by the intestinal lesions. Fütterer has experimentally shown that organisms so introduced are rapidly eliminated by the liver, and consequently appear in the biliary passages.

There is a very general belief, however, that biliary infection occurs as a result of the organisms ascending from the intestine by way of the common duct. Gilbert, in 1894, held that the B. coli communis played the most important rôle in cholecystitis, because it was found by him in the duodenum in far greater numbers than any other organism, and because it possessed motile properties which enabled it to enter the common duct. Richardson, more recently, has also supported the view that infections of the bile passages result from organisms entering from the intestine by way of the common duct.

More recent work would appear to throw some doubt upon this theory. The infection is probably in many cases from above downward, and not from below upward. Cushing, Gilbert, and Dominici, in working on the flora of the intestinal tract, have shown that the duodenum, especially of rabbits, is very free from micro-organisms. The former injected 1 c.cm. of a twenty-four-hour bouillon culture of B. typhosus into the ear vein of a rabbit. Two days later the bacillus in pure culture was recovered from the gall-bladder and duodenum. Here, of course, the infection was of hæmatogenous origin. Contrary to the general belief, the bile is a good culture medium for most organisms.

The work of Létienne shows how often organisms are present in the gall-bladder in association with lesions elsewhere in the body. Out of forty-two cases he found the bile monomicrobic seven, polymicrobic seventeen, and sterile eighteen times.

According to Richardson, the typhoid bacillus is present in the bile at some time during the disease in the great majority of cases of typhoid fever. He has also shown that the bacilli are generally agglutinated into large clumps. In six autopsies where he examined the bile with this object in view agglutination was present in five. In the sixth case the patient's blood had not given the Widal reaction during life.

The B. coli communis has also been found in clumps in the gall-bladder. Just what relation these organisms have on the deposition of bilirubin, calcium, and stone formation has not been definitely determined. There is a probability that the clumps of organisms may form a nucleus of a gallstone.

The simple presence of organisms in the gall-bladder does not seem sufficient to set up inflammation of the mucosa nor to produce cholelithiasis. Some other factor, presumably some form of irritation, such as traumatism or some hinderance to the proper evacuation of the gall-bladder, is essential.

Cushing experimentally produced several small biliary calculi of typhoidal origin obtained from gall-bladders of rabbits, in both cases at the time of inoculation the biliary apparatus having been intentionally injured. These calculi were in the early stages of development, and were similar in appearance to those described by Richardson, Gilbert, and Fournier. The chief constituents were bile-pigments combined with calcium.

Galippe first advanced the theory of the infectious origin of gallstones in general in 1886. The chief credit of the demonstration of the infectious nature of cholelithiasis belongs to Gilbert and his collaborators. Their first success was met with in January, 1897, when they obtained a definite stone from the gall-bladder of a dog previously inoculated with the B. coli communis. In May, 1897, Mignot, who had been working along the same line, obtained three small experimental calculi formed in the gall-bladder of a guinea-pig by the B. coli communis.

Mignot believes that one of the conditions essential to the formation of calculi is the extreme attenuation in virulence of the organism employed. Adopting this view, Gilbert and Fournier obtained definite calculi with the B. typhosus and B. coli communis by first attenuating these organisms by heat. The agglutination of the typhoid bacilli and the bacillus coli communis frequently seen in the bile may be analogous to this attenuation. Richardson believes that the agglutinated clumps form the nuclei about which bile-salts and pigments are deposited.

From the experimental work done the infectious nature of cholelithiasis seems well established.—*Johns Hopkins Hospital Bulletin*, August–September, 1899, p. 166

Angina and Rheumatism.—KRONENBERG (*Münchener med. Wochenschrift*, 1899, No. 27) reports a case which illustrates the relationship, often noted by others, between angina and rheumatism. It also illustrates how difficult it is sometimes to distinguish between certain cases of sepsis, ordinarily so called, and rheumatic arthritis, making the belief that rheumatism is simply a form of sepsis very inviting. A workman complained of impaired hearing, and was found to have double nasal hypertrophies. There was no history of purulent otitis, and the man had never had rheumatic pains. In October the hypertrophy was removed from one nostril with a cold snare. Three days later follicular angina began on the same side, but cleared up in a week. The wound healed well. A month later an operation was made on the other side. Three days after the operation there was pain in the wound and a small amount of secretion. Six days after the operation there was a chill, and the next day painful swellings developed in both knees, ankles, elbows, and shoulders. There was no angina. Under salicylates the patient improved so that he could leave the bed in five days; but in a few days more the joints swelled again, and again reacted favorably to salicylates. Soon after this fever reappeared, with pain in the chest and a systolic murmur over the heart. By the next day a diastolic murmur was present, and two days later there was pericarditis, with effusion. In a week the pericarditis subsided. There was no fever, but two days later symptoms of pleurisy began, followed by a serous exudate. This rapidly subsided; but during all this time one or the other joint occasionally became swollen. The operation wound was entirely healed. Five days after the signs of pleurisy subsided pneumonia developed in both bases. The physical signs improved in a few days; but a short time afterward there was a sudden rise of temperature, with cyanosis, followed by œdema of the lung and death. During the whole time the patient's urine was free from albumin, except for a slight cloudiness in the last few days. As the author remarks, the rheumatism in this case resembled very closely the picture of pyemia, and in the absence of an autopsy it hardly seems proper to consider the symptoms the result of anything else. At the same time the difference between such a case and an ordinary case of acute articular rheumatism is rather one of degree than of kind.

Hour-glass Stomach.—According to HIRSCH, reports of this interesting anomaly are infrequent in literature, being confined chiefly to English and American journals. In the congenital variety the constriction is in the middle of the organ, and the narrowed portion shows no pathological changes in the mucous membrane, the serous or muscular layers. SILVERS (*Berlin. klin. Wochenschrift*, 1899, No. 15) reports the following instructive case: A servant girl, aged twenty-six years, entered the hospital with symptoms of acute diffuse peritonitis, from which she died three and a half days after the first symptoms. She had always been healthy until five to six weeks previous to this illness. At that time she had gastric ulcer. She recovered from this, and had no further trouble until two days before entering the hospital, when she had a sudden attack of severe pain in the lower right abdomen, followed by marked distention and tenderness. Autopsy showed an hour-glass stomach. The organ was divided in the middle into two almost equal parts. Both halves measured 14 cm. from cardia and pylorus to the constriction. The cardiac half had a breadth of 15 cm. from the lesser to the greater curvature; the pyloric half in the same direction a few cm. less. The two halves were united by a tube-like portion, 2 cm. long and 2½ cm. wide, so narrow that only the little finger could be passed through. A centimetre from the constriction, toward the lesser curvature on the pyloric side, was a round opening 1 cm. in diameter, caused by a perforating round ulcer. The tube connecting the two halves was normal throughout all of its layers. Diagnosis of this condition during life is very difficult; the cases are usually found accidentally at necropsies. At times it is possible by distending the stomach to demonstrate its hour-glass form; but only one-half might be distended. Persistence of succussion after withdrawing everything possible with the tube suggests that the fluid remained in the pyloric half, the tube only reaching into the cardia. Some authors believe that if, in lavage of the stomach, food flows from the tube after the clear fluid, it is a sign of hour-glass stomach; but, as Riegel pointed out, this occurs in dilatation of severe degree without constriction. It is unfortunate that diagnosis cannot be made with certainty, since surgeons might be able to relieve some of the dangers associated with the anomaly, such as volvulus. Schmid-Monnard recently published a case in which, during life, a diagnosis of ulcus ventriculi, with resulting hour-glass stomach and incomplete stenosis, was made. By excising the ulcer and the thickened portion of the organ its form was regained and recovery resulted. Wölfler, operating on a case undiagnosticated, performed gastro-anastomosis. It is noteworthy that in the author's case the hour-glass stomach from birth performed its functions well until the twenty-sixth year, and that gastric ulcer caused death. In thirteen of the twenty-two cases of congenital hour-glass stomach—*i. e.*, almost 60 per cent—collected by Hirsch there was an ulcer not far from the constriction, and the author suggests the possibility of a relation between these.

Traumatic Paralysis Agitans.—KRAFFT-EBING reports 7 cases of the traumatic variety (4 men and 3 women) in a total of 110 cases of paralysis agitans (67 men and 43 women). Of these 7 cases, in 5 the trauma was a contusion or a sprain, in 1 there was contusion with freezing of the entire extremity, in 1 a contusion associated with a broken rib. In 19 cases of paralysis agitans Heimann reports 3 caused by mechanical traumatic conditions, Bychowski 2 in 23, Eulenberg 2 in 46 cases. The author emphasizes the fact that if the disease is traumatic it always begins at the location of the trauma, for instance, in the leg; while the non-traumatic variety, according to the classical course, begins at the distal portion of the upper extremity. The fact that paralysis agitans occurs in the young disproves the idea that atheromatous conditions play an important rôle. In Heimann's experience one patient was 33; in Leva's, one was 40; while among the author's cases one was 40 and another 44. The slightest and most varied trauma can cause paralysis agitans. In 27 cases Walz gives as causes in 6 general concussion; in 4, wounding by stab or cut; in 1, burning; in 1, freezing; in 4, sprain, luxation, or fracture; in 8, contusion, etc. Little is known of the pathogeny of these traumatic cases. Gowers emphasizes the importance of the associated shock. Charcot believed in an ascending neuritis as the link between the trauma and the paralysis agitans, an idea borne out in a case of Leyden's which came to post-mortem. Notwithstanding the fact that in several of his cases Krafft-Ebing was able to exclude the psychical factor, and in none of his cases could he demonstrate an ascending neuritis at the time of the status præsens, which was one year after the trauma, he urges the advisability of considering, especially in cases seen early, the possibility of ascending neuritis as a cause of traumatic paralysis agitans. If such were the cause the possibility of preventing serious disease by antiphlogistic and anodyne treatment would be much greater.—*Wiener klin. Wochenschrift*, 1899, No. 2.

Endocarditis.—HARBITZ (*Deutsche med. Wochenschrift*, 1899, No. 8.), from an etiological stand-point, divides endocarditis into two great groups:

1. Infectious endocarditis. Under this group are several subdivisions, classified according to the specific micro-organisms causing the disease, such as streptococcus, staphylococcus and gonococcus, endocarditis, etc.

2. Non-infectious endocarditis, or cases in which the specific infectious agent is not known, as, for example, rheumatic endocarditis. Extensive investigations concerning the cause of endocarditis make it not improbable that a number of cases of this latter group should be included in group 1. In all cases examined cultures were made on agar, serum, bouillon, and gelatin from the excrescences of the affected valves. Cover-glass preparations and sections were also prepared from the vegetations, and animals were inoculated. The cases arising principally from infection with the ordinary pus-germs—streptococcus, staphylococcus, and pneumococcus—showed such variations in their clinical course that a division into two groups seems justifiable: (*a*) In this group there are a large number of cases of acute endocarditis, which, as a rule, arise from a pus focus. They present the picture of a rapidly developing pyæmia with high fever. On section these cases generally show a diphtheroid membrane on the valves, ulcerations and necrotic foci in the valve substance, and in some cases, at the base of the valve, deep in the muscle, abscess-cavities. Multiple abscess of the skin, heart muscle, spleen, kidneys, eye, etc., are usually found; also infectious infarcts in the spleen and kidneys. The author regards many of these cases of endocarditis as a localization of the specific virus near other abscesses. They are most often caused by pyogenic staphylococci, and resemble the classical picture of an acute infectious endocarditis. (*b*) There is a large group of cases of infectious endocarditis where the inflammation of the valve entirely dominates the disease picture, and is not, as in the former group, a symptom of a general infection, but is probably the central focus from which the rest of the body becomes infected. These cases are mostly of the streptococcus or pneumococcus variety. The long duration of the disease in these cases is very striking. Ordinarily in infectious endocarditis death occurs in a few days to a few weeks. In the cases now described death sometimes does not occur until after many months. The first symptoms are usually a slight fever, rheumatic pains, general malaise; later, signs of loss of compensation, palpitation, dyspnœa, cough, hemorrhage in different parts, cyanosis, and œdema. Often the fever is not marked. In other cases it is strongly remittent or intermittent. If, at the same time, there are great pain and effusion into the joints, the case closely resembles acute articular rheumatism. At times a rapidly developing anæmia and emaciation are the most striking symptoms. The symptoms on the part of the kidneys are very interesting. They are often so striking that a clinical diagnosis of acute hemorrhagic or parenchymatous nephritis is made. In nine fatal cases of tuberculosis the author found verrucose vegetations resembling those found in rheumatic cases.

The tubercle bacilli were never found, the cultures remaining sterile in all cases. In one case a small clump of tubercle bacilli was found in a cover-glass preparation. In other cases two guinea-pigs which had been inoculated with the valve excrescences died of tuberculosis. In other diseases, such as Bright's disease and carcinoma, warty vegetations were found on the edges of the valves, but the author could not discover micro-organisms in them.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL;

ASSISTED BY

ALFRED C. WOOD, M.D., AND C. L. LEONARD, M.D.,

INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

Retraction of the Plantar Aponeurosis.—FÉRÉ (*Revue de Chirurgie*, September, 1899) reports a case in which a contraction of the plantar aponeurosis occurred in conjunction with the appearance of contractions of the palmar fascia of the hands. The lesion is of the same nature—a thick casing, with contraction and pain on standing. It is characterized by difficulty in walking, with pain along the inner margin of the foot and especially at the posterior insertion of the plantar fascia. There is a tendency to relieve the pain by turning the foot outward and walking on the outer margin. This tendency and the difficulty in walking, on account of the pain, with, in marked cases, transverse wrinkles due to the contraction, are the characteristics of the disease.

This pain, however, even with its localization, cannot be considered as absolutely characteristic, as it is met with when the fascia is overstretched, as in very obese persons, or in neurasthenics, when the muscular tone is diminished. In the latter form they are more liable to be intermittent in character. This is undoubtedly a progressive affection, and is undoubtedly of neuropathic origin. In this particular case it developed in a person having a marked neuropathic tendency, and in whom contractions of the palmar fascia were also present.

The Resection of the Cervical Portion of the Œsophagus for Carcinoma.—DE QUERVAIN (*Archiv f. klin. Chirurgie*, 1899, Band lviii., Heft 1–4), after a résumé of the literature and a careful study of fourteen cases, including a report of one of his own cases, comes to the following conclusions:

1. All carcinomata of the œsophagus that have not involved the surrounding tissues, and the lower borders of which do not extend below the upper margin of the arch of the aorta, are suitable for extirpation through the

neck. The lowest point of the upper margin should not be less than 20 cm. from the teeth.

2. Tracheotomy is seldom employed as a preliminary operation. If an opening into the trachea is found necessary it should be made as late in the operation as possible.

3. A preliminary œsophagotomy is generally replaced by a gastrostomy.

4. A gastrostomy is the best means of securing rapid healing after the œsophagus resection. It is absolutely essential to operations upon deep-seated strictures, and advisable in those situated higher up.

5. If it is impossible to fix the upper end of the lower portion of the œsophagus in the wound it can be ligated, where this is possible, and allowed to sink down into the thorax. A permanent gastric fistula is better for the patient than the dilatation of a constantly contracting scar-tissue stricture in the region of the aortic arch. Where it is impossible to unite the œsophageal ends a salivary fistula is to be expected in the neck.

6. In the after-treatment the frequent changing of an aseptic gauze dressing is of the greatest moment, with great care to separate the pharyngeal from the mediastinal ends of the wound.

On the Surgical Treatment of Hemorrhage from Gastric Ulcers.—ANDREWS and EISENDRATH (*Annals of Surgery,* October, 1899) discuss this subject from its historical and clinical aspects, and report two successful clinical interventions, in addition to experimental work, which lead them to the following conclusions:

1. The result of the practice of the best modern surgeons warrants the statements, previously made on theoretical grounds, that only operative interference can save the lives of a part of the patients affected with bleeding ulcers of the stomach—viz., those not improved by internal medicine.

2. Surgical intervention is to be recommended, first, in small, repeated hemorrhages; secondly, in severe ones occurring more than once, especially if more than 500 cm. are lost at each hæmostasis.

3. A single copious hemorrhage is not necessarily an indication for operation.

4. In ulcers at or near the pylorus, pyloroplasty (Heineke-Mikulicz) is ideal. It makes local treatment possible, and gives all of the benefits of gastro-enterostomy, and is safer.

5. Cauterization and curetting of the ulcer should give place to resection whenever the stomach-wall can be reached from without.

6. If adherent posteriorly and at the end of the stomach, cauterization, curettement, and ligature *en masse* are the best substitutes for excision.

7. Ligature *en masse* is shown by their experiments to endanger perforation except when supported by external sutures

Gastroplication for Dilated Stomach.—HORROCKS (*Annals of Surgery,* September, 1899) points out the various conditions which give rise to dilated stomachs, and that some of these are properly amenable to surgical treatment. The stomach-walls may become thin and unable to propel the contents of the stomach as a consequence of or synchronously with a catarrh of the stomach.

In obstructive pyloric disease compensatory hypertrophy is the first consequence; but this in time is followed by thinning of the walls and dilatation of the stomach. In the stomach the most fixed points are the cardiac and pyloric openings and its lesser curvature, and these parts are little changed in position when the stomach is dilated. The changes are chiefly in the lowering of the greater curvature and an extension more to the left of the middle line. Hence, in the upright position the greater curvature occupies a lower position in relation to the pylorus in a dilated than in a normal stomach, and, consequently, the mechanical difficulty of emptying the stomach is increased. Added to this is the difficulty due to muscular weakness of the thin walls of a dilated stomach, which forms a sac in which fermentation is liable to occur, as the cavity is never completely emptied.

In a case such as this the author performed plication. The first attempt afforded relief, but was unsuccessful, as catgut was used. A second operation, with silk sutures, was successful, and gave complete relief.

The So-called Sciatic Scoliosis.—Denucé (*Rev. d'Ortho.*, September, 1899) has made a careful critical study of this subject, which leads him to the following conclusions:

1. Sciatic scoliosis does not exist.

2. Idiopathic sciatica, as well as all other painful affections of the lower limbs, inclines the patient to relieve the affected limb by placing the weight of the body on the sound limb, either by tilting the pelvis down on that side or by inclining the body in that direction. There is nothing permanent in this position; it can be corrected, and even overcorrected; there is no true scoliosis.

3. The coexistence of a more or less fixed deviation of the lumbar vertebræ, with a lateral inclination of the pelvis and a sciatica, should suggest a symptomatic sciatica, which has its primary cause most frequently in a sacro-coxalgia.

A Method of Treatment for the Restoration of Entire Tibiæ Necrotic from Acute Osteomyelitis.—Cushing (*Annals of Surgery*, October, 1899) reports an instructive case in which he was able to restore the entire tibia after an acute osteomyelitis. The method employed is described by his summary as follows:

The indications are: To save the patient's life and relieve pain by immediate operation to establish free drainage. The medullary cavity should be opened, pressure relieved, and infection checked. If the bone is killed, as it usually and rapidly is in a few days, it should be removed. The most favorable time for its removal is when the periosteum and granulation tissue is in its most active generative stages, but before the process of calcification of the bone trabeculæ have shut the sequestrum within a compact, dense shell of involucrum. This point is to be determined by frequent examinations of sections of the periosteum with the microscope. It is shown by the presence of numerous fibroblasts, osteoblasts, and small trabeculæ in which lime-salts are beginning to be deposited. Clinically, it can be recognized by the slight crackling sensation as the periosteum is incised, due, probably, to the crushing of the trabeculæ by the knife. The periosteum at this stage resembles granulation tissue in color, density, and vascularity. There is no macroscopical appearance of ossification. Bone will be formed from this elastic, flexible periosteal layer.

This stage in this case was probably reached in the seventh or eighth week of the disease. At this stage the necrotic bone should be removed by incising the periosteum in the long axis of the leg and shelling out the sequestrum. The periosteal sheath remaining should be closed by sutures, leaving a solid cord or mass of periosteum buried in the centre of the leg when in its most active bone-producing condition. If areas of calcification of any extent or thickness are found adherent to the inner surface of the periosteal sheath they should be dissected off. The soft parts and skin superjacent can be closed by suture. The utmost care and most efficient means should be used to render the operation an aseptic one, for primary union is important. The new bone is formed rapidly, apparently in eighteen to twenty-four days, when the operation is done at the time above indicated. At this time ossification is so advanced that the new bone is rigid. If the operation is done too early the periosteum is injured, apparently, and its growth interfered with. If too late, a rigid, bony involucrum makes the removal of the sequestrum more difficult and forms a cavity which is very difficult to close. It is demonstrated by the radiograph that the medullary cavity is re-formed in the new bone. The shaft of the bone is easier to restore than the epiphysis.

Structure and Function of the Kidney.—ALLESANDRI (*Revue de Chirurgie,* 1899, Nos. 8 and 9) has made a careful analytical study of the experimental and clinical observations that have been made upon injuries of the kidney which involve the bloodvessels and raise the question of nephrectomy. These studies led him to undertake three series of experiments, the results of which he has summarized as follows:

The results of the ligature of the renal vein in cats and dogs are these:

1. The ligature produces grave phenomena of stasis, which interfere with the nutrition of the renal epithelium, interferes with its function, and almost completely prevents the secretion of urine.

2. A certain degree of collateral venous circulation is established, which varies with the individual and frequently compensates completely for the obliterated vein.

3. The volume and weight of the kidney, which is at first greatly augmented, diminishes rapidly, so that a portion of the kidney, by the re-establishment of the equilibrium in the circulation, resumes its life and function in an almost normal fashion. Certain other portions of the kidney are destroyed, sometimes by an anæmic necrosis, but more frequently by hemorrhagic infarction, and an epithelium of new formation gradually develops, and finally fills the lacunæ of the tubules that are greatly altered.

4. As a consequence, in many cases, after a certain time, we find the structure of the kidney preserved and its function in an almost normal state.

5. This *restitutio ad integrum* permits the kidney to sustain the rapid suppression of the other kidney and to carry on by itself the eliminating function of the entire organism.

The surgical deductions from these facts are:

1. The ligature of the renal vein is not incompatible with the life and nutrition of that organ, and may not even constitute a serious danger to the body.

2. In the second place, it is possible—as is usual—that the collateral circulation is established with the return of complete functional activity.

3. Whenever the renal vein is injured, no matter what the cause, it is the course of prudence to ligature it, and not to have recourse to a nephrectomy.

From his experiments in ligating the renal artery, and the histological study of the results produced, he deduces the following general summary:

1. The principal phenomena depend upon the sudden suppression of the *vis a tergo* and the anæmic phenomena which follow the sudden suppression of the nutritive afflux.

2. During these experiments the phenomena of stasis decreased as the result of the establishment of a collateral arterial circulation in certain parts of the cortex. The phenomena of anæmic necrosis become more marked and reach necrobiotic infarction in the zone where there is no collateral arterial circulation or where it is insufficient. The zones may be more or less extensive, and may even involve the entire renal parenchyma, as has happened sometimes in the cat.

On the contrary, in the dog, often in the parenchyma and generally at the poles of the kidney, the collateral circulation is sufficiently active to prevent the complete necrosis of the epithelium, and the circulation is sufficiently restored, so that the tissues return early to the normal and show the regeneration of the epithelium, while in many cases the *restitutio ad integrum* of a great portion of the parenchyma is produced.

3. This *restitutio ad integrum* may be after a certain time (about two months and a half) so complete that the kidney, although the artery has been ligated, is preserved and has its function. It is, however, impossible to remove the other kidney, as in the case of the vein. The surgical applications of these results are very important.

In the cat the artery cannot be ligated, and a nephrectomy is always to be preferred.

In the dog, on the contrary, the artery may be ligated without producing the rapid and complete loss of the kidney, and with a good chance that the organ will recover its function in a great measure. Thus the ligature is not a dangerous procedure for the organism, but is followed by remarkable functional results.

In man the presence of a collateral circulation through the suprarenal arteries, the diaphragmatics, the lumbars, and the ureterals, as anatomy has shown, give a chance of obtaining the same results as in the dog.

When both artery and vein were ligated the results were as follows:

1. The ligation of both artery and vein was found to be incompatible with the life and function of the renal epithelium.

2. The collateral circulation was established with sufficient rapidity to prevent the necrosis of the organ. On the contrary, a gradual, progressive cirrhosis was observed, which strangled little by little the remnants of the canaliculi and glomeruli.

3. As a consequence, when both artery and vein are ligated no function can

be expected to remain in the renal substance, even in part. The organism is not menaced by a rapid necrosis of the renal tissue; this tissue, on the contrary, is capable of living or of a transformation into fibrous tissue by the proliferation of the interstitial connective tissue, which does not die, as does the epithelial.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,
OF PHILADELPHIA,

AND

THOMPSON S. WESTCOTT, M.D.,
OF PHILADELPHIA.

Kernig's Sign in Cerebro-spinal Fever.—In the course of a paper on the "Etiology and Diagnosis of Cerebro-spinal Fever," read before the West London Medico-Chirurgical Society, June 10, 1899, WILLIAM OSLER (*The Canadian Practitioner and Review*, August, 1899, p. 447) states that of twenty-one cases of the disease observed during the recent epidemic in Baltimore, Kernig's sign was found in all in which it was looked for. "It is an old observation," he remarks, "that in protracted meningitis the patient lies with the thighs flexed upon the abdomen and the legs partly flexed on the thighs. To test for Kernig's sign the patient should be propped up in bed in the sitting position; then, on attempting to extend the leg on the thigh, there is contraction of the flexors, which prevents the full straightening of the leg. On the other hand, in the recumbent posture the leg can be fully extended. Many patients with meningitis cannot sit up, but the test can be equally well applied by flexing the thigh on the abdomen, when on attempting to extend the leg, if meningitis be present, the limb cannot be fully extended. Fries found the sign in fifty-three out of sixty cases, and Netter in forty-five out of fifty. Its presence is no indication of the intensity of the spinal involvement. Netter's explanation of the phenomenon is as follows: In consequence of the inflammation of the meninges the roots of the nerves become irritable, and the flexion of the thighs upon the pelvis when the patient is in the sitting posture elongates, and consequently stretches the lumbar and sacral roots, and thus increases their irritability. The attempt to extend the knee is insufficient to provoke a reflex contraction of the flexors while the patient lies on his back with the thighs extended upon the pelvis, but it does so when he assumes a sitting posture."

[An abstract of Netter's paper, presumably the one from which Dr. Osler quotes, will be found in this department of THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, February, 1899, p. 218. This phenomenon must be accepted as a valuable confirmatory sign in meningitis, but it cannot be elicited in every case, even when the clinical diagnosis and subsequent autopsy are affirmative.—ED.]

Parkinson's Syndrome in Childhood.—E. WEILL (*Revue Mensuelle des Maladies de l'Enfance*, June, 1899, p. 241) reports a case in a girl, aged ten and one-half years, in whom he observed this complexus of symptoms, which is usually considered as a peculiarly adult affection, rarely seen before the age of forty years.

The patient had varicella when three years of age, and when in her tenth year had suffered a severe fright. Fifteen days later she complained of severe pain in the head and took to bed. A fortnight later she could speak only with great effort, and three days later the right side was completely paralyzed, and the next day the entire body was affected. She remained in this condition for a month, when motion began to return in the right hand, and then progressively in the other limbs. When seen a year later it was observed that the head was inclined slightly forward, the back was arched, the arms semi-flexed and exhibiting a condition of slight rhythmical oscillations, flexing the forearm on the arm and the fingers on the hand. These were absent during sleep. There were athetosic movements of the hands and feet, the fingers being generally stiff in forced extension when there was no trembling. The face was expressionless, and there was difficulty in walking. When the eyes were closed the child showed a tendency to fall backward. Sensibility was nearly intact, but she complained of a constant feeling of heat. While indifferent in appearance to what was going on about her, there was no impairment of intelligence, but she answered questions with a certain slowness.

When compared with typical cases of Parkinson's disease this patient showed several abnormal symptoms: the localization of athetosic movements to the extremities, the predominance of rigidity on the right side, and the existence of right-sided equino-varus. But these do not affect the general picture of Parkinson's syndrome.

The author attributes the affection in this case to some infectious disorder involving the nerve-centres, which can be assigned to the time at which she took to bed, complaining of severe headache. This was followed by a right hemiplegia, and then by a generalized paralysis. The only difference between this case and a typical infantile hemiplegia lies in the appearance of Parkinson's stiffness as opposed to habitual contracture. Weill, however, thinks that this difference is not sufficient to separate the two conditions, believing that between contracture, properly so called, and Parkinsonian stiffness there are intermediate conditions, such as in mild or improving cases of Little's disease, in which rigidity disappears during repose and only develops on the occasion of movements. The cause must have been a diffused cerebral affection, followed by diplegia from involvement of both hemispheres. Perhaps it directly or secondarily involved the region which Brissaud considered as the centre of paralysis agitans—the peduncle near the locus niger.

An examination of the literature yields six cases in which, as in the present case, the disease began before the age of twenty-one years: Huchard (beginning at three years); Lannois (twelve years); Pierret (fourteen years); Sachs (fifteen years), and Duchenne (sixteen years and twenty years).

Tuberculosis in Childhood.—The following conclusions of a paper read by GEORGE F. STILL at the recent meeting of the British Medical Association

(*British Medical Journal*, August 19, 1899, p. 455) are of interest as confirming the opinions already formulated by Northrup, of New York, as to the most usual initial lesion of tuberculosis in childhood:

1. The commonest channel of infection with tuberculosis in childhood is through the lung.
2. Infection through the intestine is less common in infancy than in later childhood.
3. Milk, therefore, is not the usual source of tuberculosis in infancy, perhaps owing to the precautions taken in boiling, sterilizing, etc.
4. Inhalation is much the commonest mode of infection in the tuberculosis of childhood, and especially in infancy.
5. The overcrowding of the poorer population in the large towns is probably responsible for much of the tuberculosis of childhood, and prophylaxis must be directed to the prevention of this overcrowding, the improvement of ventilation, and the inculcation of the extreme importance of fresh air during the earliest years of life.

Gastro-intestinal and Scrotal Hemorrhages in an Infant One Month Old.—AUSSET and DERODE (*Congrès de Lille*, 1899, in *Annales de Médecine et Chirurgie Infantiles*, September 15, 1899, p. 705) reported the case of an infant, aged thirty-two days, which presented an absolutely uncontrollable hemorrhage from an insignificant excoriation of the scrotum. The next day hæmatemesis and melæna occurred. Death rapidly intervened. The patient was the ninth child, the others having perished prematurely. The authors attribute the hemorrhages to hereditary syphilis, which had caused a generalized endoperiarteritis. While gastro-intestinal hemorrhages from this cause are rare, this is thought to be the first case on record in which hemorrhage from the scrotum has been described.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Treatment of Gastric Hemorrhage.—M. LE DR. M. SOUPAULT discusses (1) the treatment of abundant hemorrhage. The patient is to remain absolutely quiet in bed, lying on his back, making no movements, not even speaking. Nothing is given by the mouth, except small pieces of ice, to be swallowed whole. Quiet and retraction of the stomach-wall are thus obtained and are highly favorable to cicatrization of the bleeding points. Saline enemata (four ounces given twice during the day) lessen the thirst, which is always great. Nutrient enemata can be caused to pass high up in the rectum by the aid of the rectal sound, and it is quite possible for them to continue on past Bauhin's valve and undergo digestion in the usual way in the small intestine. Diarrhœa and proctitis often follow rectal alimentation, and these can be avoided by using the following: Thin bouillon and wine, 60 drachms each, and two ladlefuls of peptones. Alimentation can thus be carried on for several months; it is a great hardship for the patient, however, who suffers from thirst and often from hunger. In general, rectal feeding is to be continued three or four days after complete cessation of hemorrhage. Recurrence of hemorrhage or of vomiting demands a return to rectal enemata. Cold milk, a spoonful at a time, is first given when the patient returns to mouth-feeding. This is gradually increased. When 60 ounces are taken daily without bad effects, soups and eggs may be added. Meat, as such, should be prohibited for at least one month. To arrest the hemorrhage ice may be introduced into the rectum, or it may be locally applied on a level with the scrotum. Enemata of very hot water have also been used (118° F., Tripier). The heat causes vaso-constriction reflexly, and favors the formation of a clot. Temporary ligature of the extremities will increase the blood centrally. Collapse is treated hypodermatically with ether, caffein, and camphorated oil. Hypodermoclysis and intravenous injection are recommended. The author adds small doses of bismuth subnitrate and prepared chalk to the milk. Abundant hemorrhage, with profound anæmia, should *not* receive surgical intervention. 2. Treatment of less severe hemorrhage. When frequently repeated, ulcer of the stomach is the probable cause. Where medication by mouth is indicated the following is useful: Bismuth subnitrate and prepared chalk, each 10 parts, and distilled water 100 parts. Both are insoluble, and, coating the ulcer, protect it, and cicatrization is aided. The fractional doses of chalk neutralize hyperacidity, and do not, like sodium bicarbonate, excite secondarily the gastric secretion. In these milder instances surgical interference is indicated and is often successful. Hemorrhage due to cirrhosis cannot be treated surgically. Hysterical hemorrhage may yield to hypnotism. 3. The treatment of mild hemorrhage (that accompanying cancer and ulcerative gastritis) is like that for gastritis in general. A milk diet with bismuth is advisable. Boas recommends silver nitrate. Sodium chlorate, 75 grains in the twenty-four hours, in many doses will cure the small hemorrhages of cancer.—*Revue de Thérapeutique*, 1899, No. 8, p. 253.

Guaiacol- and Creosote-carbonates.—DR. FRITZ HÖLSCHER reports upon the use of these remedies in both acute and chronic diseases of the respiratory passages. These are not merely symptom remedies, but they act directly upon the cause of the disease, in that by impregnating the body with creosote combinations they influence unfavorably the conditions of life, of the causes of the disease, and later improve the symptoms by eliminating poisonous products of retrograde metamorphosis. The discoloration of the urine is not a symptom of poisoning, and should not alarm the patient. After large doses of creosote-carbonate free creosote is eliminated through the lungs. The marked observed results are: (1) Great increase of appetite; (2) rapid, often great increase of weight; (3) fever, night-sweats, and weakness disappear, even if they have persisted for a long time; (4) cough and expectoration diminish, and bacilli disappear from the sputum; (5) the physical signs disappear after six months, although longer treatment may be advantageous.

Apical bacillary catarrh comes to an end in two or three months. In acute pulmonary disease (pneumonia, bronchopneumonia, grippal pneumonia) is cut short by timely exhibition of large doses of creosote-carbonate, as has been shown by Cassoude and Corgier. The characteristic crisis comes on in twenty-four hours, and auscultatory signs are not found. At present creosote-carbonate is less expensive than guaiacol. In view of the extensive use of these remedies, carefully conducted clinical research, with tabulated results, is important.—*Tageblatt für den Kongress zur Bekämpfung der Tuberkulose,* 1899, No. 3, S. 19.

Cantharides as a Hæmostatic in Hæmaturia.—MR. W. H. HENDERSON reports that a patient who had suffered with hæmaturia for two and a half years was immediately benefited and soon cured. He had tried very many hæmostatics without avail. Before beginning with cantharides the urine was almost black and loaded with red blood-cells. There were anæmia, depression, and malaria. No stone could be found in the bladder. Five-minim doses of the tincture of cantharides were given daily. After three days the urine cleared and the dosage was gradually lessened, the urine remaining perfectly clear and healthy. Later, general tonics were used. The writer attributes the good results to the tonic effect of cantharides on the kidney.—*The Indian Medical Gazette,* 1899, vol. xxxiv., No. 118.

The Disinfectant Action of the Cresols.—DR. C. SEYBOLD reports that metacresol, orthocresol, paracresol, tricresol, phenol, and guaiacol are equally ineffective against the bacilli of malignant pustules and their spores, since in 2 per cent. solution they do not destroy the latter after twenty-six days. The cresols surpass phenol and guaiacol in disinfectant action in the presence of vegetable micro-organisms, as staphylococcus pyogenes aureus, the bacillus pyocyaneus and prodigiosus. The cresols more active against these bacteria are, first, metacresol, then paracresol (Hauff), while orthocresol and tricresol act equally, and should be placed third. Among isomeric cresols the most poisonous is paracresol and the least metacresol. The addition of sodium chloride to a half of 1 per cent. solution of metacresol may be convenient, but practically does not add to its efficiency. The metacresol should be recommended in practice because it is more disinfectant than phenol, is not so toxic, and 2 per cent. solutions are clear, odorless, and do not injure the hands or instruments.—*La Riforma Medica,* 1899, No. 59, p. 108.

Treatment of Forty-three Cases of Typhoid Fever.—DR. E. C. SENFERT puts the patient in bed at once; a hair mattress with rubber covering is best. Frequent bathing, in alcohol, of hips, back, and heels prevents bed-sores in every instance. The diet must be liquid, digestible, and palatable, there being the least possible residue. Milk is unsurpassed if it agrees with the patient. Daily examination of the stools is requisite, for if curds are present, fermentation, gases, distention, and possible perforation may result. Milk may be given raw, boiled (especially if diarrhœa is present), or diluted with mineral or lime-water; daily allowance, one to three quarts. If milk is improperly digested, (1) the quantity must be reduced, (2) it requires predigesting, or (3) it must be abandoned. In its stead, koumyss, buttermilk, or malted milk may be given. Beef-juices, teas, and meat-extracts can be given, except when there is diarrhœa, for they then aggravate the trouble. Following a severe attack no solid food of any kind should be allowed until there has been complete apyrexia for ten days. Solids are to be permitted in milder forms of the disease two or three days earlier. During the first week of feeding with solids, milk-toast, soft eggs, scraped beef, etc., may be given, and toward the end, chicken, steak, and potatoes. Boiled water cooled should be given liberally when thirst is marked. Ice often increases thirst. Eight drops of diluted phosphoric acid added at times to a glassful of water allays thirst and aids digestion. Hydrotherapy: Equal parts of alcohol and cold water should be used. If the temperature rises above 102.5° F. a sponge bath should be given every two hours, otherwise every three or four hours. An ice-cap on the head is of value. If the fever cannot be reduced by sponging a wet-pack should be substituted. Intense headache is best managed by the ice-cap. Antipyretics are condemned, as they reduce the fever and the patient's strength.

The above hydriatric measures were substituted for the full tub bath in the cases reported. The sponge bath acts as a cardiac and nerve tonic and hypnotic. It diminishes muscular twitchings and tremors. Strict cleanliness of the mouth cavity will very often prevent abscess of the parotid or middle ear. Medicinal treatment consists in elimination and intestinal antisepsis. The formula used was: Calomel, one grain; sodium bicarbonate, two grains; sugar of milk, one grain and a half, to be given, irrespective of constipation and diarrhœa, every two hours for one day. The most satisfactory intestinal antiseptics are salol, naphtalin, and guaiacol carbonate. First week: Salol, five grains every two hours, in gelatin-coated pills. Second week: Naphtalin, five grains every three hours. Third week: Guaiacol carbonate, two and a half grains (capsule) every three hours, until convalescence. Rubinat water was used for constipation, malto-yerbine for early bronchitis, a drachm every two hours. Sulphonal, ten grains occasionally, for sleep. No alcoholic stimulants. Meteorism and diarrhœa were treated with oil of turpentine, two minims; deodorized tincture of opium, three minims, in emulsion, every three hours. Convalescence beginning, intestinal antiseptics should be replaced by tonics. Maltine was found acceptable. Wine of pepsin can be added if digestion is weak. Constipation was best treated with cascara. A final tonic contained maltine, iron, quinine and strychnine. The average duration of the fever was twenty-one days. Children have the disease lightly and recover more rapidly; this is ascribed to the unirritating diet taken by the very young.—*The New York Medical Journal,* 1899, No. 1080, p. 233.

Inoperable Epithelioma of Larynx and Neck Treated with Formalin Injections.—Mr. J. D. McFeely reports the history of a patient suffering from an enormous epithelioma of the larynx and neck, embarrassing breathing. On the first day five minims of a 25 per cent. solution of formalin were injected, anæsthesia being first produced by hypodermatic injections of eucaine, etc. Next day ten minims of a 30 per cent. solution were injected —no increase in pain. Two days later fifteen minims of pure formalin in as much water were injected. Slight pain followed, with increase in dyspnœa and dysphagia. The tumor became less vascular, and only one drop of blood exuded. Orthoform was used over the point of injection; it prevented destruction of skin and produced some local anæsthesia. Later, fifteen minims of formalin in ten minims of water were injected, the same local anæsthesia being used. As a result the growth round about became less vascular, the skin livid, the tumor was softer and was beginning to disintegrate. Two weeks later, anestile being used to freeze the skin, and eucaine as before, twenty minims of formalin in ten minims of water were injected into the lower and more vascular part of the tumor. Later, twenty-five minims of pure formalin were injected. Raw, sloughing surfaces resulting from the formalin injections were dressed with pads soaked in formalin, eucaine being first used. Until death there was a slow diminution in size of the tumor, without any hardening. The writer concludes: (1) As much as half a drachm can be injected into the body without causing toxic symptoms. (2) Though powerful, it is less likely than other styptics to cause clotting or embolism. (3) Pure formalin is probably as safe as a dilution. (4) Undiluted, it causes more rapid anæsthesia. (5) It retards cell multiplication and growth in malignant tumors. If any of the neoplasms owe their malignancy to any low form of organic life, formalin being so destructive to these, not only palliation but cure may follow its wise use.—*British Medical Journal*, 1899, No. 2013, p. 272.

The Treatment of Gonorrhœa.—Dr. Klopp, in speaking of the early treatment of the first acute attack, objects to argentamin because of its irritating properties and the uncertain results obtained. His use of argonin is limited, because of its cost and because it has not met expectation. It is useful if irritation must be avoided. Protargol does not seem to have especial advantages, and in polyclinical work it has been used for weeks in increasing strength without producing an impression. Largin, in from one-fourth to one and one-half per cent. solutions, promises good results, and for that reason should be included among useful drugs.—*Münchener medicinische Wochenschrift*, 1899, No. 31, S. 1005.

Sanarelli's Anti-amarylic Serum.—Dr. E. P. Archinard reports on fourteen patients suffering from yellow fever. The amount of fluid injected was five drachms into the loose tissue of the lumbar region. The conclusion is drawn that the serum has no curative power. Symptoms are unaffected. As a result of laboratory experiments on animals the immunizing power of the serum is also greatly questioned.—*New Orleans Medical and Surgical Journal*, 1899, vol. lii. p. 86.

Tetanus Treated with Antitoxin.—Dr. A. de Toanna first saw the patient nine days after injection. There was an angry wound on one finger from which pus exuded on incision. The local condition was treated by excision and the application of a half per cent. solution of iodine trichloride. Bromide and chloral were given. Five drachms of tetanus antitoxin were injected into the external part of the arm, five drachms in the shoulder, and as much more at intervals along the spine. All the injections were made within six hours. Twelve hours later the patient was much improved and had a pulse of ninety, with normal respiration and temperature. Ten drachms of antitoxin a day were given for three days. Rapid improvement followed. Injections were continued for a fortnight, seventy drachms in all. Complete recovery followed.—*New York Medical Record*, 1899, No. 1499, p. 161.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Changes in the Ovaries during Pregnancy.—SCHNELL (*Zeitschrift für Geb. und Gynäkologie*, Band xl., Heft 2) compares the microscopical differences in the ovaries of the non-gravid and of women during pregnancy and the puerperium. In the latter he found peculiar changes in the albuginea, consisting in the development of round-cells and spindle-cells, which, when stained, showed rod-shaped nuclei. They were also observed in a case of extra-uterine pregnancy.

The writer infers that under the influence of pregnancy the connective tissue of the albuginea is stimulated to increased growth. The smooth muscular fibres throughout the stroma are unchanged.

Climacteric Neuroses.—WINDSCHEID (*Deutsche Praxis*, 1899, No. 7) believes that these are essentially hysterical and neurasthenic, as shown by the predominance of the various reflexes. The latter may be due to irritation of the nerve-ends in the ovary in consequence of atrophy and contraction of the tissues. Some of the nervous phenomena are merely a persistence of the ordinary psychical disturbances of menstruation. He regards metrorrhagia as the only symptom which requires special medication. The nervous symptoms are best treated by change of environment, especially high altitudes, warm baths, hydrotherapy, electrotherapy, and massage. He has seen no beneficial results follow the administration of the animal extracts.

Formation of Tubo-ovarian Cysts.—ZAHN (*Virchow's Archiv*, Band cli., Heft 2), from a study of eighteen cases of tubo-ovarian cysts and two of "tubo-ovarian cyst pregnancy," infers that the generally accepted view with regard to their mode of development is erroneous, since the ovary has little to do with the formation of the cyst-wall. The latter is composed almost entirely of the dilated ampulla and infundibulum. Tubo-ovarian cysts possess considerable clinical importance, since they are sometimes the seat of extra-uterine pregnancy.

ORTHMANN (*Virchow's Archiv*, Band clv., Heft 2) arrives at directly opposite conclusions as the result of an examination of a series of specimens. He distinguishes two varieties of tubo-ovarian cysts, in one of which the tube is more or less dilated, while in the other the lumen is unchanged. In any case cystic enlargement of the ovary is necessarily present. He denies that secondary dropsy of a Graafian follicle may occur, as stated by Zahn.

If the ovarian cyst develops primarily the tube bears only a small part in the formation of the tubo-ovarian cyst, since the tube is attached to the outside of the latter, its abdominal end being elongated and compressed, the fimbriæ being spread out on the wall of the cyst and the ostium abdominale closed by adhesions. Communication between the tube and the cyst may be established by rupture of the latter, but more often in consequence of atrophy of the wall.

Calcareous Deposits in the Ovary.—RIES (*Zeitschrift für Geb. und Gynäkologie*, Band xl., Heft 1) reports three cases in which calcareous nodules, varying in size from a cherry to a pigeon's egg, were found in the interior of the ovary. Two of these were of stony hardness, showing, on section, a nucleus of soft detritus, lying in a cavity which was lined with a smooth membrane, devoid of epithelium. The capsule was a structureless membrane, infiltrated with lime-salts. The writer believes that these nodules result from the deposition of calcareous matter in the lutein-cell layer of a corpus luteum, the central cavity being formed secondarily.

Palliative Treatment of Inoperable Carcinoma.—GESSNER (*Veit's Handbuch der Gynäkologie;* abstract in the *Centralblatt für Gynäkologie*, 1899, No. 29) summarizes this subject as follows: The three symptoms to be relieved are hemorrhage, offensive discharge, and pain; the two former may be checked by judicious operative interference. Narcosis is advisable, for the moral effect as well as for the purpose of doing thorough work. The technique is, briefly, disinfection of the field of operation, thorough curettement with a sharp spoon, deep cauterization, and tamponade with iodoform gauze after the application of boro-tannin. The tampon is removed in five or six days, and after separation of the slough strong tincture of iodine is applied.

Chloride of zinc is more or less dangerous, since its action cannot be controlled. Chloride of iron, pure carbolic acid, and other similar caustics produce no permanent effect, and must be used repeatedly. Injections of alcohol, pyoktanin, etc., are painful and uncertain. The flap operations of Martin, Chrobak and others are of limited application.

If no operation is possible the best local treatment is the application of dry disinfectant and astringent powders. Permanganate of potash (1:1000) is the best solution for vaginal injection, peroxide of hydrogen and thymol being also recommended.

Narcotics should be used sparingly at first, the coal-tar derivatives being tried before opium.

Direct Ligation of Vessels in Cœliotomy.—GUBAROFF (*Centralblatt für Gynäkologie*, 1899, No. 30) argues against the use of mass ligatures, believing that bleeding vessels should be caught and ligated as they are divided. The advantages claimed are: 1. The operator can see exactly what tissues he is cutting because their anatomical relations are not so distorted as they are when they are included in ligatures; in conservative operations particularly this is a marked advantage. 2. Only vessels which actually bleed are tied, hence there is no possibility of their slipping subsequently; there is less danger of including nerves, ureters, etc., in the ligature. 3. Adherent tumors are quickly freed by rapid division of the tissues without preliminary ligation. 4. By this method of direct hæmostasis much time is saved and the operation is performed with precision and safety.

The writer adds that large vessels, as the ovarian and uterine, are, of course, caught with forceps as soon as they are divided. Venous hemorrhage, as Doyen has shown, is best controlled by tying the accompanying arteries.

Conservative Treatment of Chronic Inversion.—BORELIUS (*Centralblatt für Gynäkologie*, 1899, No. 30) reports a case of puerperal inversion which was admitted to his clinic two months after the accident. A colpeurynter was inserted and left *in situ* for several hours, when it was removed on account of pain. The patient was then treated for a month unless an extensive tear in the posterior vaginal wall had entirely healed. At the end of this time manual reposition was attempted under anæsthesia, without result. A transverse incision was made in the posterior vaginal fornix, Douglas' pouch was opened, and two fingers were introduced into the inversion ring. Reposition was still impossible. The cervical ring was next incised, but it was still impossible to reinvert the uterus. The vertical incision was prolonged downward to the fundus and the inversion overcome. The uterus was then drawn backward and downward, so that the wound in the organ could be sutured, when it was restored to the abdominal cavity, and the vaginal opening was partly closed after introducing a drain of iodoform gauze. The convalescence was afebrile, the drain being removed on the tenth day. The uterus remained in a position of retroflexion.

[To the impartial critic this operation, ingenious as it is, cannot compare with the simple and rational procedure devised by Thomas, in which, under the direct guidance of the eye and finger, the inverted uterus is replaced without injury to the organ, and certainly with no more risk than accompanied the method above described.—ED.]

Intravaginal Fixation of the Prolapsed Uterus.—WERTHEIM (*Centralblatt für Gynäkologie*, 1899, No. 14) applies Freund's plan of utilizing the uterus to close a vesico-vaginal fistula to the treatment of prolapsus in women who have passed the age of child-bearing. He opens the anterior vaginal fornix by a transverse incision, separates the bladder, incises the vesico-uterine fold of peritoneum, and draws the fundus uteri down into the vagina. The wound is then closed around the cervix. An oval surface is denuded on the anterior vaginal wall, and a corresponding surface on the posterior wall of the uterus, and these are united. The anterior surface of the uterus undergoes a process of granulation, but eventually cicatrizes. In the two cases reported the uterus remained in a position of extreme anteversion, the portio-vaginalis being in the posterior fornix.

Influence of Castration on the General System.—PFISTER (*Archiv für Gynäkologie*, Band lvi., Heft 3) reports the results of observation of the subsequent condition of 179 women whose tubes and ovaries were removed for various reasons. Menstruation ceased entirely in 94 8 per cent.; vicarious hemorrhages were noted in 12 cases; leucorrhœa was noted in 20 per cent. The writer believes that in virgins sexual desire ceases entirely after castration, its persistence in some married women being rather due to cultivation or persistent psychical impressions. Atrophy of the uterus was invariably noted, though the vagina and external genitals did not necessarily share in the process. He infers that the sexual desire and atrophy of the external genitals are less affected by castration than are the menstrual function and the nutrition of the uterus.

Senile Endometritis.—LORAIN (*Rêvue Médicale*, 1899, No. 2) believes that this condition is always due to the presence of micro-organisms, being most common in women between fifty and sixty years of age. The cachexia and fetid, often bloody, discharge arouses the suspicion that it may be due to carcinoma, but it would not appear until the advanced stage of the latter disease, when pain and enlargement of the uterus would have already been noted. Curettement furnishes a positive means of diagnosis. The writer recommends gradual dilatation of the cervix and irrigation with a solution of ichthyol or tincture of iodine.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE: VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Post-partum Hemorrhage.—In the *Scottish Medical and Surgical Journal* for September, 1899, is found a clinical lecture on this subject by JARDINE, physician to the Glasgow Maternity. He calls attention to the important function in preventing hemorrhage exercised by the retraction of the muscle of the uterus. Recognizing as a primary cause exhaustion of the uterine muscle, he urges that in no case should labor be allowed to drag on indefinitely. If in the second stage the pains are lessening he urges the use of forceps. He properly draws attention to the fact that most post-partum hemorrhage follows improper conduct of the third stage of labor. When the placenta is adherent he would peel it off from the uterus, retaining the hand within the cavity and kneading the uterus firmly between the two hands. He has great confidence in hot intra-uterine douching with sterile water for hemorrhage. He often employs lysol or creolin in 1 per cent. solution, using a long, curved, grooved glass nozzle, which he considers especially valuable. It gives a good flow, can be sterilized by boiling, is cheap, and if made of heavy glass is not easily broken.

He condemns the use of iron within the womb, but has found abundant evidence of the value of intra-uterine packing with iodoform gauze. He allows the gauze to remain for twenty-four hours or more.

He has used saline injections into a vein, into the rectum, and into the cellular tissue. He considers the injection of such fluid into the cellular tissue most valuable. In considering traumatic post-partum hemorrhage he draws attention to the familiar and interesting fact that the worst tears of the cervix and pelvic floor are in cases of spontaneous delivery. He sometimes employs the forceps successfully to prevent tears. He would close the cervix by stitches for extensive tear with or without hemorrhage. He would invariably close all extensive wounds of any part of the genital tract. If hemorrhage continues after labor he would thoroughly explore the uterus with the finger, to remove whatever might be there, or would use the douche curette. The debilitating effect of hemorrhage is fully described, also its important influence in lessening the patient's power of resistance to septic infection.

The writer describes a hæmatoma as a form of post-partum hemorrhage. This commonly arises from ruptured veins in the broad ligaments, in the vagina or vulva, and fluctuating swelling in the pelvis is the sign of such a condition.

Should the clot become septic the cavity must be opened at once, thoroughly washed out, and packed with iodoform gauze. Should the cavity not become infected the patient should be kept absolutely clean and absorption favored by promoting her general condition and by avoiding severe and injurious pressure.

Acute Infection of Umbilical Origin.—In the *Annales de Gynécologie et d'Obstétrique*, July, 1899, GENDRE and VARNIER report the case of a healthy infant, delivered by forceps at full term, whose cord was ligated with aseptic silk and whose umbilicus was dressed with sublimated cotton. The child was nursed by the mother and seemed to be in normal condition. A little later, however, the mother's nourishment failed, and it was noticed that the cord had not separated. In giving the child a bath the nurse, impatient to see why the cord had not come off, opened the dressing hurriedly and handled the stump of the cord roughly. The cord was detached, leaving a fresh, oozing surface. The cotton dressing was replaced.

The grandmother of the child, who witnessed the disturbance of the cord, became alarmed, and the child's physician was summoned. On the following day considerable fever and prostration existed, although no inflammation about the umbilicus was present. The child's nurse was suffering from grippe, and it was thought very probable that the child shared this infection. The fever was treated by cool and tepid baths, which produced favorable results. An erythema appeared upon various portions of the body; this was ascribed to sepsis. The fever lasted five days, gradually subsiding. No other lesion developed, the umbilicus gradually closed, and the child recovered. In the absence of any other diagnosis the case is considered one of infection of the umbilicus.

Ectopic Gestation Complicated by Tuberculosis and by Gonorrhœa.—MOSZKOWICZ reports two cases of ectopic gestation with unusual complications (*Centralblatt für Gynäkologie*, 1899, No. 34). The first was that of a patient, aged twenty-five years, who had irregular hemorrhage from the uterus for four months. A tumor was found upon the left side, and the abdomen was opened and the tumor removed. There were abundant tubercular nodules and serous fluid in the abdomen. Upon opening the tumor, which had been removed, it was found to be the distended tube, tuberculous, and containing an ovum. The peritoneal covering of the tube was very vascular, and infiltrated with small cells and with tubercle. In some places a small-cell infiltration extended into the muscular tissue of the tube.

He also reports a case in which there was hemorrhage, with the formation of a hæmatoma. The right tube was a pyosalpinx, the contents of which contained abundant staphylococci and gonococci. A tubal pregnancy also existed.

Adhesion of the Placenta to the Fœtal Head.—In the *Centralblatt für Gynäkologie*, 1899, No. 31, ZDERAS reports the case of a primipara, thirty-two years old, who gave birth to a monstrosity. The anterior wall of the abdomen was defective and also a portion of the envelope of the brain. The interesting feature of this specimen was the adhesion of the placenta and the head. This began in the bregmatic region, near the right ear, extending to the neck and the edge of the hair and across to the left ear. The scalp blended directly with the placenta; the chorion and amnion could be distinguished, and the umbilical cord arose from the middle of the placenta.

The writer quotes but one similar case in the literature, in which the amnion had been lengthened out to a band extending from the placenta to the head. A short umbilical cord favored in this case the adhesion of the head and the placenta.

Cæsarean Section and Symphysiotomy.—In *L'Obstétrique*, July 15, 1899, BAR reports twenty-two cases of symphysiotomy, with detailed statements regarding the operations. He concludes, after a long paper upon the subject, that the operation has a very limited application. In choosing symphysiotomy we must take into account the very probable injury to the soft parts of the mother, the greater risk of injury and death to the fœtus, and the very considerable danger of infection. It is only in pelves of moderate contraction that symphysiotomy is indicated, as all cases of considerable pelvic contraction should be treated by Cæsarean section or craniotomy.

In a limited class of cases, however, under aseptic precautions and upon patients not exhausted and infected, the operation is successful.

Spontaneous Inversion of the Uterus.—In the *Annales de Gynécologie et d'Obstétrique*, July, 1899, QUEIREL reports the case of a primipara who had a spontaneous expulsion of the fœtus. The placenta became partially detached and free hemorrhage resulted, for which an intra-uterine douche was given. There was, however, no attempt made to express the placenta, and no traction was made upon the cord. The placenta appeared at the vulva by one border, and underneath the pubis a pocket formed, composed of the membranes filled with blood. To facilitate the delivery this pocket was opened and the blood and placenta were expelled. The membranes were retained. The patient had a few expulsive efforts, followed by the sudden appearance of the uterus, covered by the membranes, at the vulva. The womb was immediately replaced, and the patient made a good recovery.

Cæsarean Section in Septic Cases.—In the *Archiv für Gynäkologie*, 1899, Band lix., Heft 1, DOKTOR reports an interesting case from the clinic at Budapesth: The patient was a multipara who was admitted in labor, the spontaneous expulsion of the child being impossible, because of a tumor growing from the sacrum. The necessity for Cæsarean section was positive, and the question of a choice of method remained for solution.

On extracting the child, which was dead, the appendages were found partly decomposed, and the uterine cavity contained offensive gas. Fortunately, through efficient help, the contents of the uterus were kept outside the abdomen. The womb was amputated. A strand of gauze was passed through the cervix for drainage, and the upper borders of the stump were united.

The patient made a tedious recovery from sepsis. She had a characteristic eruption and pelvic exudate and pleuropneumonia. She recovered sufficiently to be transferred to the medical department of the hospital, where her lung symptoms indicated a permanent infection, probably of tuberculous nature.

Doktor has collected from the literature of the subject twenty-one cases of Cæsarean operation in septic patients. A study of these cases leads to the following conclusions:

The incision of the uterus, the extraction of its contents, and suture of the womb was followed by a mortality of 40 per cent., while those patients that recovered had prolonged fever. A still worse result followed amputation of the uterus with extraperitoneal treatment of the stump. The mortality of these cases was between 40 and 50 per cent., and the patients who recovered suffered from pus-formation in the stump and various septic complications.

Those cases treated by amputation of the uterus with intrapelvic treatment of the stump did better than either of the foregoing. The mortality of this series was 14.27, and the morbidity embraced the complications of sepsis as in the other methods of treatment. So far as the comparison goes, at this point the best results were obtained by amputation of the womb, with intraperitoneal treatment of the stump.

It would, however, be most desirable to remove the septic womb and contents from the patient without contaminating the abdomen if this could be done. This has been effected in two cases by total extirpation of the pregnant womb through the abdomen. In each of the reported cases the mother recovered without complications.

We must conclude from this interesting study that in cases of septic infection affording considerable risk in delivery through the vagina the womb and contents should, if possible, be removed without being opened in the body of the mother.

The Bacteria Found in the Puerperal Uterus.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, 1899, Band ix., Heft 6, STAHLER and WINKLER give the results of investigations which they have conducted in examining bacteria found within the puerperal uterus.

In the greater number of cases when fever is absent the cavity of the womb was found sterile. In perfectly normal patients, however, living saprophytes are found which create no symptoms so long as their products are discharged with the lochia. It is most probable that the less poisonous forms of bacteria can produce a mild inflammation of the endometrium without a rise of temperature above 100° F. In a third of those cases in which the patient had a temperature above 100° the cavity of the uterus was found to contain germs which proved to be anaërobic bacteria.

Hydramnion in Cases of Homologous Twins.—At a recent meeting of the Obstetrical Society of London, Wilson (*British Medical Journal*, June 17, 1899) read a paper upon this subject.

Although twins from separate ova are seven times more common than those from a single ovum, polyhydramnios is found almost as often in the latter as in the former. He reported cases of unioval or homologous twins in his own practice, and had collected twenty other cases. These patients are usually multiparæ, and had normal pregnancies during the first few months. Active polyhydramnios began at the fourth or fifth month, causing severe pressure symptoms. In nearly every case premature labor came on spontaneously before the end of the seventh month. In about 20 per cent. labor was induced. Twin fœtuses of the same sex were usually present in these cases, one of which was much larger than the other, inclosed in an amnion with a great amount of fluid. The smaller fœtus usually had the normal quantity. These cases had one placenta, one chorion, and two amnions, and in the larger fœtus the heart and kidneys were very greatly hypertrophied. The mother was healthy, and neither child was malformed. When the relation of the vessels in the two fœtuses was examined with reference to the placenta a cause was found for the hydramnios. The twin whose vessels were more directly connected with the placenta had the larger share of blood. It accordingly grew faster and had the larger heart. It took up an increased quantity of fluid in the placenta, and so produced the increased exudation or secretion from the kidneys, skin, and portion of the placenta belonging to it. This fluid accumulated, producing the very great hydramnios.

A diagnosis can often be made in these cases by noticing that the signs of the fœtus were limited to a small portion of the circumference of the amniotic cyst. The appropriate treatment lies in inducing labor by puncturing the membranes.

In discussion, Spencer had found in examining such patients that by putting the patient in the knee-elbow position the fœtus sank to the lower part of the abdomen, and could be readily felt. If doubt exists as to the presence of an ovarian cyst or polyhydramnios, he would carefully pass a bougie. He thought that other causes beside those described by Wilson must be present in many of these cases. In one of his own cases the fœtuses were almost of the same weight and the hearts were normal. The cord of the hydramniotic fœtus was much twisted and œdematous. He thought that polyhydramnios might arise from abnormality in either the fœtal or maternal circulation, and also that the urine is one of the sources of this fluid.

OTOLOGY.

UNDER THE CHARGE OF

CHARLES H. BURNETT, A.M., M.D.,
AURAL SURGEON, PRESBYTERIAN HOSPITAL, ETC., PHILADELPHIA.

Prophylaxis of Acute Otitis Media.—Lermoyez (*La Presse Méd.*, 1897, No. 16; *Archiv f. Ohrenh.*, December 17, 1897) gives the following directions for the prompt so-called prophylactic treatment of acute otitis media: 1. The patient with an acute coryza must, first of all, protect himself against taking more cold. 2. The nares must receive antiseptic treatment. 3. Quinine and laxatives must be given. 4. Lavage of the nares in all forms must be absolutely avoided; the nose *must be blown gently.* Patients having imperfect nasal respiration, and therefore a tendency to otitides, must receive appropriate nasal treatment. *No vesicatories on the mastoid; no emollients* at any period of the disease. Treatment before suppuration should consist: (1) In instillations of carbolic acid 1 : 10 or 1 : 20, in glycerin and water; also drops of the following as hot as bearable: Aq. carbolis (1 : 100), 10.0; cocaine mur. 2.0; atropin. sulph. 0.05. Absolute rest of the ear, no syringing, no inflammation. (2) Compresses wet with a warm solution of boric acid or phenosalyl, 1 : 500, should be placed on the auricle or over the mastoid region, in order to try to bring about resolution. If pain continues, ice should be placed on the mastoid process, and warm carbol glycerin, as warm as can be borne in the auditory canal—*i. e.*, warmth inside and cold outside of the ear. (3) Chloral should be given, to produce sleep, in preference to opium, as the latter tends to congest the head. (4) Saline purgatives and hot foot-baths. (5) Antisepsis of the nose and mouth, by gargles and moppings. (6) If fever and prostration are marked the patient should remain in bed, with the head elevated and the room cool. He should remain in his room several days and avoid everything conducive to congestion of the head. If no improvement occurs in the course of twenty-four hours, paracentesis of the drum-membrane must be performed. During suppuration secondary infection must be guarded against by continual antiseptic treatment of the nose and throat. Twice daily instillations of antiseptic drops should be applied to the auditory canal, with inflation of the tympana. [We question the wisdom of the inflations.—Ed.] If premature closure of the perforation takes place a new paracentesis must be performed.

Paracentesis of the Membrana.—Paracentesis for the relief of congestion of the membrane, and, as a consequence, prophylaxis, is recommended by W. Milligan (*Liverpool Med. Clin. Journ.*, July, 1897). [Paracentesis of the membrana tympani should never be performed in acute otitis media, excepting to give an outlet to secretion in the drum-cavity; otherwise, infection of the drum-cavity might take place from sepsis communicated from the outer ear. In every instance before paracentesis is performed the external auditory canal should be rendered aseptic, so that, when a communication between the drum-cavity and the outer ear is made, infection of the former by septic matter in the latter may be prevented. Hence, the best time to syringe the acutely inflamed ear is before the discharge takes place, so that when the latter occurs it may be into an aseptic cavity or one as nearly so as possible. Thus the chances of secondary infection of the drum-cavity are minimized; and if the outer ear is not then deluged with various remedies, but the middle ear allowed to drain itself through nature's drainage-tube, the external auditory canal, secondary infection will never occur, and we will not have so many cases of acute consecutive mastoiditis.] Paracentesis and cautious antisepsis and drainage are advocated by T. C. EVANS (*Medicine*, September, 1897); E. B. DENCH (*Journ. Amer. Med Assoc.*, March 19, 1898); F. L. JACK (*Boston Medical and Surgical Journal*, August 19, 1897); H. V. WURDEMAN (*Pacific Medical Journal*, October, 1897); S. W. SMITH (*Medical Record*, October 16, 1897); J. A. WHITE (*Virginia Medical Semi-monthly*, October 22, 1897), and W. MILLIGAN (*Liverpool Med Clin. Journ.*, July, 1897). The objections to paracentesis in ordinary acute otitis urged by R. H. WOODS (*Dublin Journal of Medical Sciences*, January, 1898) are founded on the observation of a large number of cases of what he terms "acute otitis media without pain."

[Cases answering this description must have been instances of myringodermatitis or myringitis, rather than otitis media, such as have been described by J. E. SHEPPARD and C. H. BURNETT (*Year-book of Medicine and Surgery*, 1898), and by R. W. SEISS (*Journ. Amer. Med. Assoc.*, March 19, 1898). In any case of accumulation of fluid in the drum-cavity, especially if pain or dulness of hearing, or both, are present, prompt paracentesis is indicated. If the fluid in the drum-cavity is not thus let out, it may organize and lead to synechiæ. If myringodermatitis occurs, and if blebs form on the membrana, the former may be punctured if pain is great; otherwise it may be let alone, and spontaneous rupture or absorption awaited. In puncturing a bulla or a blebs of the membrana, care must be taken not to puncture the inner wall of the sac, for if this inner wall is punctured the infectious contents will pass into the drum-cavity and inoculate it.] E. GRUENING (*New York Polyclinic*, January 15, 1898) maintains that if the general practitioner would promptly and properly incise the drum membrane in acute otitis media there would be no brain abscesses or sinus thromboses to treat; but, in order that general practitioners should be able to do this, they should receive in their student days better instruction regarding the examination and local treatment of the ear.

Middle Ear in Tuberculosis.—W. WINGRAVE (*London Otol. Soc.*, October 29, 1897; *Ann. des Mal. de l'Oreille*, April, 1898) has observed optic neuritis in connection with tuberculosis of the middle ear in a woman, aged twenty five years. The onset of the eye lesion was sudden and painful. All symptoms disappeared in about a week.

The relation of tubercle of the middle ear to intracranial disease, DR. MACEWEN states (*British Medical Journal*, 1895, No. 1820), has not received the attention that its importance demands. Tubercle is one of the less obtrusive forms of middle-ear inflammation, spreading slowly, and occasions but little pain. In some cases the disease reaches an advanced stage without causing perforation of the membrana tympani, yet its extension to the meninges—especially in children whose sutures are still open—is always liable to occur. In tubercle of the internal ear the extension proceeds doubtless by the pial coverings of the seventh and eighth nerves in the internal auditory canal. The importance of tubercle of the middle ear depends upon the complications that may follow. The logical deduction is that tubercle here, as elsewhere in the body, should be thoroughly eradicated, if at all accessible. The mastoid process should be freely opened and the whole of the recesses of the temporal bone exposed, if this object is to be accomplished. Another point of the greatest importance relates to the question of operating in the presence of swarms of pyogenic organisms. Fresh surfaces are thus exposed to the action of the germs, and serious intracranial invasion may follow as the result of such a septic operation. The only safety lies in the application of the most rigid antiseptic measures. (See editorial in *University Medical Magazine*, Phila., August, 1897.)

Mastoid Operations in Chronic Purulent Otitis Media.—F. MARSH (*British Medical Journal*, April 30, 1898), from his experience, considers that the necessity exists for "a mastoid operation in all cases of suppurative middle-ear disease which do not yield to careful treatment by ordinary methods."

[Cases in which the suppuration grows markedly better, even if it does not cease under prolonged local treatment, should not be exposed to the risk of sepsis by opening the mastoid through healthy bone tissue, simply with the object of checking a chronic purulency and warding off an otitic brain lesion which may never occur. Cases of chronic purulency properly treated by antiseptic instillations and washes for years, grow slowly better and finally entirely recover. Mere chronicity, therefore, with slowly but surely improving conditions in the ear, is not sufficient reason for radical operation on the temporal bone. These cases must be watched and their tendency noted before deciding to open the mastoid antrum.—ED.]

Agorophobia Caused by Aural Lesions.—LANNOIS and TOURNIER (*Ann. des Mal. de l'Oreille*, October, 1898) have formulated the following conclusions regarding agorophobia (used here to mean fear of crossing an open space, like a wide street or square) in an etiological relation to ear diseases, based on the observation of ten cases: 1. Agorophobia is not a primary affection; it is a syndrome, making its appearance only in a special neuropathic soil. 2. A cause of agorophobia, rather than any other phobia, is in a very large number of cases an aural lesion having produced subjective noises and vertigo. 3. When the determining cause has been a fright not connected with a vertigo, aural lesions are very frequently the reason for the continuance of the agorophobia.

[From reading the notes of the cases presented by the authors we are forced to conclude that the agorophobia they describe was in reality ear vertigo. The latter disease always brings with it an unwillingness to leave the house alone or to cross the street or an open space, because if alone the patient is deprived of the support of posts, walls, etc., obtainable on the sidewalk.—ED.]

OPHTHALMOLOGY.

UNDER THE CHARGE OF

EDWARD JACKSON, A.M., M.D.,
EMERITUS PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC;
SURGEON TO WILLS EYE HOSPITAL, ETC.,

AND

T. B. SCHNEIDEMAN, A.M., M.D.,
PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC; ASSISTANT
SURGEON TO WILLS EYE HOSPITAL, ETC.

Theory of Accommodation.—PRIESTLEY SMITH (Birmingham) seeks to reconcile the observations of Tscherning with the theory of Helmholtz. Tscherning found that during accommodation the anterior surface of the lens does not, as Helmholtz supposed, become more globular, but that it changes to a hyperboloid curve—becomes more curved at the centre of the pupil and flatter at the margin. This, he contended, could only be caused by tightening of the zonule, supplemented by internal resistance at the pole of the lens. On the other hand, the experiments of Hess confirm Helmholtz's view that the zonule is relaxed during accommodation. Priestley Smith shows that the changes noticed by Tscherning can be produced by relaxation of the zonule, if the elastic resistance of the lens is supposed to be least at the anterior pole of the lens and to increase toward the equator.—*Ophthalmic Review*, November, 1898.

Influence of Accommodation on Intra-ocular Pressure.—C. HESS and L. HEINE (Marburg) have made experiments to ascertain what changes of intra-ocular pressure might be produced by the act of accommodation. They found that in the eye of an ape a change could be produced by eserin or faradism amounting to 10 or 12 D. of accommodation. The animal being anæsthetized, and the intraocular muscles divided so as to prevent any external pressure being brought to bear on the globe, the interior of the eye was connected with a manometer so delicate that it indicated the changes of intra-ocular pressure due to every pulsation of the vessels. Different observers noted the changes produced by faradism in the anterior lens reflex, in the refraction of the eye by skiascopy, and in the manometer. No effect was produced on the intra-ocular pressure by the strongest accommodation.—*Graefe's Archives f. Ophthalmol*, vol. xlvi. pt. 2.

[This observation is of importance, because it negatives the assumption that accommodation causes increase of intra-ocular tension, which has been made the basis of an argument against the correction of myopia. The argument has been proved fallacious, both by theoretical reasoning and clinical experience; but, having the support of the older authorities, it still influences the practice of some ophthalmologists. The theory that glaucoma was caused by excessive accommodation has also had acceptance among few, in spite of the well-known influence of eserin (which causes most violent spasm of accommodation) in relieving glaucoma. It, too, loses a large part of its slender foundation through these observations.—Ed.]

Accommodation in the Lower Animals.—J. W. Barrett (Melbourne), under the title "Do Animals Accommodate?" reports that he was unable to detect, with the shadow test, any evidence of accommodation in the eyes of mammals except in those of monkeys. He examined a good many species of wild and domestic animals, and concludes that it is probable that the accommodation apparatus is rudimentary or absent in mammals with the exception of man and monkeys.—*Ophthalmic Review*, September, 1898.

T. Beer has made a very complete study of accommodation in the eyes of the lower animals. He finds that among the cephalopods and some fishes the refraction is highly myopic, but that there is a power of negative accommodation, by moving the lens back toward the retina, which enables them to focus even parallel rays of the retina. In the higher vertebrates the refraction of the eye adapts it for more distant vision, and the power of accommodation assists to see clearly nearer objects. In the anphieia and reptiles the lens, unchanged in shape, is dragged forward from the retina in accommodating. In the higher vertebrates accommodation is effected by rendering the crystalline lens more convex through relaxation of its suspensory ligament. The greatest range of accommodation is found in the eyes of a few truly amphibious animals, as the terrapin, and is sufficient to give them clear vision either in air or water. Among the lower mammals the power of accommodation is generally much less than in man. It is especially deficient among the rodents, and Beer failed to discover any in the eyes of the hare or the rabbit.—*Wiener klin. Woch.*, October 20, 1898; and *Ophthalmic Review*, September, 1898.

Priestley Smith succeeded in producing an accommodation change in the freshly excised eye of the rabbit amounting to 4 D.; and he has seen with the shadow test the refraction change in the living eye of the rabbit from approximate emmetropia to considerable myopia.—*Ophthalmic Review*, October, 1898.

Holocain for Corneal Ulcers.—H. Derby (Boston) having noticed that when used as an anæsthetic holocain did not affect unfavorably the corneal epithelium, as did cocain, was led, on account of its bactericidal properties, to employ a 1 per cent. solution of it in the treatment of corneal ulcers. The results obtained were uniformly favorable. Pain was promptly relieved, and healing appeared to be hastened by the application of the drug. Derby reports cases of serpent ulcers, corneal ulceration with purulent conjunctivitis, and painful and recurring ulcers which were all favorably influenced by this treatment. While the series of cases is too small to establish the value of holocain in this direction, it justifies a further careful trial of the drug.—*Archives of Ophthalmol*, January, 1899.

Treatment of Scleritis and Episcleritis.—Dr. Grandclement (Lyons) recognizes two forms of scleritis, a more superficial episcleritis, and a deeper, which he terms sclero-choroiditis anterior. For eight years he has treated cases of both kinds with subconjunctival injections of the solution of cyanide of mercury into or near the wine-colored spot of hyperæmia. Generally three or four injections bring about a cure of the deep-seated lesions. In episcleritis the benefit of this treatment is a little less rapid and less striking, but an equally good result is attained in a little longer time. The more marked influence of the treatment in the deeper seated lesions Grandclement would associate with what he believes to be the beneficial influence of the same treatment in disease of the uveal tract.—*La Clinique Ophthalmol.*, 1899, No. 3.

Reclination of the Lens.—E. VALUDE (Paris) reports a case in which one eye, operated on for senile cataract, was lost by expulsive hemorrhage, and the patient, aged seventy-three years, was anxious to have the other eye operated on. Fearing hemorrhage if he did extraction, he resorted to the operation of "couching" the lens. Through a small incision in the sclera behind the ciliary region he introduced a small curette, with which the lens was depressed, and held a few seconds in its new position. It showed no tendency to rise again behind the pupil. Vision of 1/3 was obtained, and the condition of the eye continued excellent a month and a half later.—*Annales de l'Oculistique*, January, 1899.

DERMATOLOGY.

UNDER THE CHARGE OF

LOUIS A. DUHRING, M.D.,

PROFESSOR OF DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA,

AND

MILTON B. HARTZELL, M.D.,

INSTRUCTOR IN DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

Resorcin-alcohol in the Treatment of Seborrhœic Eczema of the Face.—A. C. FRICKENHAUS (*Monatshefte f. prakt Derm.*, June 1, 1899) recommends rubbing small patches of this disease once with a 25 per cent. solution, and then in a few days with a 10 per cent. solution. At night the skin may be anointed with a cold-cream ointment. In eight days cure usually results. In stubborn cases of eczema of the nose the author has used a 50 per cent. solution with excellent effect. The application is also recommended for tinea versicolor.

[Inasmuch as authors and observers are not all in accord on the subject of so-called seborrhœic eczema, the remedy suggested should be used at first with caution, lest it prove irritating.—ED.]

Case of Acute Disseminated Miliary Tuberculosis of the Skin.—PELAGATTI (*Giorn. Ital. d. Mal. Ven. e d. Pelle*, 1898, and *British Journal of Dermatology*, July, 1899) records a case occurring in a child, aged two years, the cutaneous disease appearing after measles, along with acute tuberculosis of the lungs and intestines. The eruption consisted of hemispherical papules the size of hemp-seeds or rather larger, of a yellowish-red color, without surrounding hyperæmia, sharply defined from the earthy-white skin on which they were seated. The centre of each papule was rough and scaly. There was no grouping, no itching. Some papules disappeared, leaving no trace; others increased in size, forming nodules with scales adherent to their summits. On removing the scales a concavity remained; a few scars were left, like those of variola. The skin lesions consisted of typical tuberculous formations, with giant-cells and large numbers of tubercle bacilli.

Eleven Cases of Porokeratosis (Mibelli) in One Family.—GILCHRIST (*Journal of Cutaneous and Genito-urinary Diseases*, April, 1899) reports eleven cases of this very curious affection occurring in one family in four generations. Histological examination of excised lesions showed that there was a true hyperkeratosis, which occurred primarily most frequently around the mouth and intra-epidermal portion of the sweat-duct. In some lesions it began around the mouth of the hair-follicle; in others both the sweat-duct and hair-follicle were involved at the same time. In some instances the hyperkeratosis affected not only the sebaceous follicle, but extended into the acini. No micro-organisms were found. Heredity apparently plays a very important part in the production of the disease. In one case treatment consisted in the excision of all the small lesions. In two cases the electric needle was used with excellent results.

Rose-spots in Influenza.—PELOU (*La Presse Méd.*, 1898, No. 33) directs attention to the commoner cutaneous manifestations met with in influenza, and states that he has observed the rarer "rose-spots" in three cases of influenza, the patients presenting distinct enteric symptoms. The diagnosis made was enteric fever, but this was not substantiated. The author points out the error of regarding these spots as pathognomonic of enteric fever, as they may recur not only in influenza, but also in septic endocarditis, the typhoid form of puerperal fever, and in the enteritis of children.

New Agent for the Treatment of Alopecia Areata.—GRANVILLE MACGOWAN, of California (*Journal of Cutaneous and Genito-urinary Diseases*, May, 1899), advocates the topical use of trikresol in this disease, in most instances used pure or in the form of an ointment. It is considered superior to carbolic acid (which causes irritation and pain), and the author's good results in a number of cases warrant him in recommending the drug. From the histories of the cases reported we learn that the average time of cure was two and one-half months, irrespective of the age of the patients. The drug was rubbed into the scalp about once every fifth day.

Acne Urticata.—LÖWENBACH (*Archiv für Dermatologie und Syphilis*, Band xlix., Heft 1) reports a case of this unusual affection, with a careful microscopical study of the lesions. A man, thirty-five years of age, had suffered ten years from a strongly itching eruption, which had resisted all forms of treatment. The parts affected were the extensor surfaces of both forearms, the axillæ, the supraclavicular and infraclavicular regions, the neck, the scalp and forehead, along the spinal column, around the anus, the inguinal regions, and the popliteal spaces, the parts which suffered most being the nape, the scalp, and the forehead. The eruption, which began as slightly reddened and elevated hard wheals, was preceded by intolerable burning and itching; with the appearance of the wheals the itching diminished somewhat, but was still severe. After their appearance the wheals continued to enlarge for a short time peripherally; a drop of serum appeared in the centre, which dried into a crust; after some days the centre of the lesion became depressed, with diminution of the itching, and the crust fell off, leaving a shallow, depressed scar. As the old lesions disappeared new ones appeared, and in this manner the disease continued year after year. A microscopical examination showed in the peripheral parts a simple, in parts nearer the centre an inflammatory œdema of the cutis, which led to a collection of free fluid in the papillary body and the consequent formation of a small, epidermoidal vesicle upon the point of the papilla. In the centre of the wheal was a necrotic mass, pierced by the duct of a sebaceous gland, the gland itself and the accompanying hair-follicle being surrounded by an intense infiltration of polynuclear leucocytes. Clinically and microscopically acne urticata appears to stand midway between acne necrotica and chronic urticaria.

Blastomycetic Dermatitis.—HYDE, HEKTOEN, and BEVAN (*British Journal of Dermatology*, July, 1899) report a case of this rare disease. It is due solely to the invasion of the skin by one of the plant forms of the yeast family. In its clinical aspect it resembles lupus vulgaris in the ulcerative stage. Potassium iodide is worthy of a trial in all cases.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

CHARLES HARRINGTON, M.D.,
ASSISTANT PROFESSOR OF HYGIENE, HARVARD MEDICAL SCHOOL,

AND

EDWARD F. WILLOUGHBY, M.D.,
OF LONDON.

The Possibility of Tubercular Infection Through Milk, Butter, and Oleomargarine.—To determine whether or not the milk of cows in the first stages of tuberculosis, with no evidence of lesions of the udder, and that of animals with latent tuberculosis proved only by the reaction to tuberculin, may justly be regarded as dangerous to the health of the consumer, DRS. LYDIA RABINOWITSCH and WALTER KEMPNER (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxxi., 137) undertook a series of experiments at the Veterinary College in Berlin. The results of researches by a number of scientists, to whose work detailed reference is made, show that the percentage of samples of market milk containing the bacilli is very high, ranging from 6 to 55, but many of the reports are faulty by reason of a lack of accurate statements as to the results of clinical examinations, section, and other particulars. In their investigation fifteen cows that had reacted to tuberculin were used. With one exception the tests were made three months after the inoculation with tuberculin. Inoculation experiments and microscopical examination were made at the same time. Guinea-pigs were injected with milk which had been centrifugated, and positive results were obtained with the milk often of the animals. The microscopical tests were, however, less successful, the presence of the bacilli being so proven in but two instances, and thus the inadequacy of this line of proof is shown. They conclude, therefore, that milk derived from cows which have reacted to tuberculin must be regarded with suspicion, and express the hope that private and governmental attention may be drawn to the importance of the tuberculin test. Concerning the subject of danger from the ordinary commercial butter, DR. KUNO OBERMÜLLER (*Hygienische Rundschau,* ix., No. 2) reviews his own already published results and the work of those who followed him, and reports his later investigations. At the time of his first publication but three researches on the subject had been reported. BRUSAFERRO had obtained positive results from nine samples of market butter; BANG from one specimen made from the milk of a cow with a tuberculous udder, and ROTH from two out of twenty samples from diseased cows and from the market. His first positive results were obtained with ordinary creamery butter made from the mixed milk of a large number of cows, and every sample showed the existence of active bacilli. Other investigators—RABINOWITSCH, PETRI, SCHUCHARDT, and GRÖNING—obtained widely differing results. In his first experiments he used unsalted butter, which, it happens, contains more bacteria than salted butter, and this fact may explain the rapidity with which his positive results were yielded. His later experiments were made with salted butter of the best quality, which was inoculated in the melted state in amounts of 3 to 5 c.c. Many of his animals dying, he became convinced that the cause of the irritation lay in the butter fat itself, and, therefore, in his next series he used the watery fluid separated from the butter by the aid of heat and centrifugation. Using ten samples with forty-one guinea-pigs, the inoculations conducted with all the usual precautions, he obtained positive results from four, the genuineness of bacilli being demonstrated by all the known methods. None of the animals died of peritonitis; all remained healthy or else showed tuberculosis, and this fact confirms his opinion as to the effects produced by the fat itself. The influence of the fat itself as an irritant has been shown by Petri, Hormann, and Morgenroth as well. It appears, too, that the changes due to the presence of the spurious bacillus tuberculosis diminish after three weeks, and that a false diagnosis, which may be made early in the progress, when peritonitis may be present as a complication, cannot occur with the fat-free residue at a more advanced period. All his animals remained normal up to five to six weeks after the inoculations, and then the characteristic effects appeared in those that yielded any results. Although we have no positive evidence that butter has been or is an exciting cause of tuberculosis, two things may be insisted upon—namely, increased knowledge as to the dangers incurred by the use of milk and milk products, and the importance of governmental control of milch cows, particularly with reference to the tuberculin test.

A preliminary note on the possibility of infection by oleomargarine is published by DR. MORGENROTH (*Hygienische Rundschau*, ix., No. 10), who draws attention to the fact that in the preparation of this product a temperature of 45° C. is not exceeded, and that the fat is mixed with milk which may contain the bacillus in question. From the results of his work, not yet published, it may be said with certainty that genuine virulent bacilli may often be demonstrated in this article of food.

Autumnal Diarrhœa in Cities.—DR. E. W. HOPE (*Public Health*, July, 1899) has during the past few years investigated over a thousand fatal cases of autumnal diarrhœa, and now presents some interesting facts. Of 233 infants under three months of age, only 16 had been exclusively breast-fed; the other 217 had received other food in addition to or instead of breast milk. The desirability of postponing weaning until the season of prevalence of epidemic diarrhœa has passed cannot be better demonstrated than by these figures. He was struck by the large number of instances in which more than one case occurred in the same household, the most remarkable case being that of an infant's home in fairly good sanitary condition. Here were ten infants of an average age of five months, all in perfect health until a few days after the admission of a child two months old suffering with diarrhœa and vomiting, when six of the ten were similarly seized, and the other four were sent away. The seven cases, in all of which artificial feeding was the method used, terminated fatally.

Dr. Hope lays especial emphasis upon the importance of municipal cleanliness, and shows the beneficial effects of heavy rains. It appears that the disease rages most violently when the amount of rainfall is low, and declines to a minimum when heavy showers rather than continuous rainfall occurs, the explanation being that the atmosphere and the resting-places for decomposing dirt and filth are thoroughly washed by drenching rains and freed from dust. Figures are given which prove the association of rainfall and diminished mortality from choleraic diarrhœa during the past twenty years, six of which were average wet summers. The extremes of rainy and dry summers were in the years 1891 and 1895 respectively, and the mortality of those two years in particular is most striking:

Period and average weather.	Average rainfall June to September.	Annual average of deaths from diarrhœa in third quarter of year.
6 average wet summers	13.8 inches.	373
14 average dry summers	10.9 "	573
Extreme wetness, 1891	16.0 "	203
Extreme dryness, 1895	7.7 "	819

Formaldehyde Disinfection.—A description of the so-called Breslau apparatus for formaldehyde disinfection is given by DR. M. VON BRUNN (*Zeitschrift für Hygiene und Infectionskrankheiten*, xxx., p. 201), who claims for the process both efficiency and cheapness. The apparatus consists of an alcohol lamp and a kettle with an outlet in the cover to which a rubber tube can be attached. Three and a half litres of fluid can be brought to a boil in ten minutes, and three litres evaporated in an hour. It can be left in the room itself, like Schering's lamp for pastilles, or it can be kept outside with the delivery tube discharging into the room through the keyhole. The best results are obtained by using the agent in as dilute a form as is consistent with safety to wall paper and other objects which might be injured by condensation of too much water. The best dilution is one part formalin and four of water. It is said that formaldehyde can be set free from the dilute solution without danger of polymerizing, that the greater part of the vapor condenses with the steam in a short time on the walls and on all the contained objects when it acts not as a gas but as a solution, and that good results are obtained in seven hours, using 750 c.c. of formalin to 100 cubic metres of air space (about a pint and a half to 3500 cubic feet). Some experiments with the paraform pastilles are reported by DR. A. W. FAIRBANKS (*Centralblatt für Bakteriologie*, Abth. I., xxiii., Nos. 1, 2, and 16), whose results are in accordance with those of many other observers, and only add to the evidence that the penetrating power of the gas is practically *nil*, and that as a surface disinfectant the agent is unsurpassed in efficiency. Mice and rabbits exposed from eight to thirty hours were immunized, and the experimenter himself found no difficulty in remaining in the room for a long time, which fact suggests either very gradual evolution of gas or unusually resistant conjunctivæ and nasal mucous membranes.

Detection of Horsemeat in Sausages.—T. BASTIEN (*Journ. Pharm. Chim.*, through *Analyst*, 1896, p. 73) gives a method for the detection of as little as 5 per cent. of horsemeat, even in the presence of starch. Twenty grammes of sausage, finely minced, are boiled from half an hour to an hour in about 100 c.c. of water. The volume of water is reduced by evaporation to about 30 c.c., then the whole is cooled and filtered. About 10 c.c. are tested with a few drops of compound iodine solution (1 part iodine, 12 parts iodide of potassium, in 100 parts of water). A fugitive reddish-violet coloration indicates the presence of horsemeat. The reagent must be added carefully, since a slight excess changes the color to reddish-brown. If starch is present the broth is decanted when cold, and from one to two volumes of acetic acid added, according to the amount of starch. Then, after standing five minutes, the liquid is filtered and tested as before.

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are received only *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

DR. ALFRED STENGEL, 1811 Spruce Street, Philadelphia, U. S. A.
Or
DR. HECTOR MACKENZIE, 59 Welbeck St., Cavendish Sq., London, W., Eng.

125

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

FEBRUARY, 1900.

SOME CASES OF DILATATION OF THE STOMACH.[1]

By John H. Musser, M.D.,
PROFESSOR OF CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA,
AND
J. Dutton Steele, M.D.,
INSTRUCTOR IN CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA.

The few cases of atonic dilatation of the stomach whose histories we have the pleasure of detailing are of interest because they were selected from patients of about the same age, the same sex, pursuing the same vocations, and, in a measure, possessed of similar habits. Moreover, they presented allied objective and subjective symptoms, and their true nature was recognized by resorting to the same methods of observation.

We take the liberty of presenting them conjointly, because as a result of our studies the same conclusions have been arrived at, and, therefore, the Section is not burdened with more than one paper. Our thoughts were led in the same direction because some of the cases were under our united professional care. The other cases were studied separately, but, as indicated above, presented such similarity that we thought it wise to group them in one report. These cases afford us the opportunity of stating some methods of diagnosis and points in etiology which we believe are worthy of consideration.

Case I. (J. H. M. and J. D. S.).—Male, aged twenty-four years; medical student; single. Parents both living; father is dyspeptic; mother is of a neurotic disposition. She has had attacks of articular rheumatism and nodular accumulations in the tendons in the region of the hand and fingers, and has numbers of tophi. One brother healthy and strong, but also inclined to be of a nervous disposition. Two sisters living and healthy.

---

[1] Read before the Section on Medicine of the College of Physicians of Philadelphia, October 10, 1899.

The patient had children's diseases—measles, whooping-cough, mumps, and chickenpox—and slight rheumatism. No venereal disease, and knows of none in his family. Habits have been good as to alcohol and tobacco. Has had hay fever for three years past.

The present disease began in 1896, during the second year of his medical course. He managed to get through the year, although his symptoms gradually grew worse until he stopped work in May, 1897. He improved during the summer, and returned to work in October, 1897.

Soon after his return the same symptoms reappeared, and he was forced to leave the University for the year. During the two winters in the city he received treatment for lithæmia and chronic gastritis by means of diet and various drugs and tonics. During the spring and summer of 1898 he was employed in duties that kept him much in the open air, and he returned to study in the autumn, very much improved.

When first seen, in October, 1898, he presented the following symptoms: Dulness of intellect, slight tinnitus aurium, specks before the eyes, twitching of muscles of the face, no headache, but a feeling of dizziness; sounds seemed far off, and there was considerable mental depression. He complained of insomnia—it took him from one to four hours to get to sleep; he was not refreshed, and dreamed a great deal. He also complained of a bad taste in his mouth. The tongue was furred. He suffered from gaseous eructations, and sometimes directly after eating, but sometimes not until an hour or more had passed. There was practically never any regurgitation of food. As a rule, there was no pain, but sometimes he suffered from colic. Flatulence and borborygmus occasionally was quite decided. Stools were normal and regular. There was some twitching and tenderness of the muscles. There were, however, no signs of tetany. There were nodules in the cartilages of the ear and tendons of the hands.

Physical examination of the lungs and heart showed them to be healthy. The abdominal organs were in their normal position. The urine was of high color and specific gravity. It showed nothing abnormal, but was somewhat scanty. The blood-count showed 3,000,000 red cells per cubic centimetre. The skin was harsh and dry, and the hair was falling out. The stomach was washed out before breakfast, and about 100 c.c. of fluid, with small particles of food, were always obtained. Splashing could be heard in the stomach area before breakfast. The stomach was inflated with air repeatedly, and a considerable amount of dilatation without gastroptosis was always demonstrated by this method. The size and condition of the stomach did not change materially during the time in which he was under observation. An Ewald test breakfast was given, and one hour afterward 70 c.c. of fluid were obtained by aspiration. Hydrochloric acid was present in good quantity and lactic acid was also absent. Microscopical examination showed a few red blood-cells and considerable mucus. In washing out the stomach the water flowed in freely, and two or three litres were taken without discomfort. The return flow was, however, slow and unsatisfactory. The full amount sent in at any time was never recovered, and the washing never came away clear, even after forty minutes' work. After Christmas he finally gave up his medical course and went to his home in the mountains of Northern Pennsylvania. He has since improved considerably, both in his general health and gastric symptoms.

Case II. (J. D. S.).—Male, aged twenty-five years, single; student in the architectural department; born in the United States. Father and mother both living and well. No tubercular or rheumatic family history. There does not seem to be any neurotic taint in the family. The patient had measles, whooping-cough, and varicella in childhood. He appears to have been perfectly healthy, and led an active and outdoor life up to his seventeenth year in one of the States in the Northwest.

He does not smoke, but takes an occasional glass of beer. Has never had any venereal disease, and there is no history of sexual excess. He lived at home and led a regular life. In October of his eighteenth year he began work in a cold, damp office, and became somewhat indiscreet in his diet, using an excessive amount of sweets. He then began to suffer from frequent attacks of indigestion. In time a subacute gastritis appears to have developed. He complained of fulness in the epigastrium after eating, and pain in the same region, usually about three hours after eating. There was very little eructation. Constipation was often very obstinate. These symptoms were aggravated by any indiscretion in diet. He lost about eighteen pounds in weight. His gastric symptoms gradually grew worse. For the next six years he worked in an architect's office at draughting, using his eyes continuously, and during this period he suffered more or less with gastric trouble. In his summer vacation he says he was very well, and could eat almost anything.

In September, 1897, he came to the University, and soon after commencing work his gastric symptoms became much aggravated. He came under observation in January, 1899.

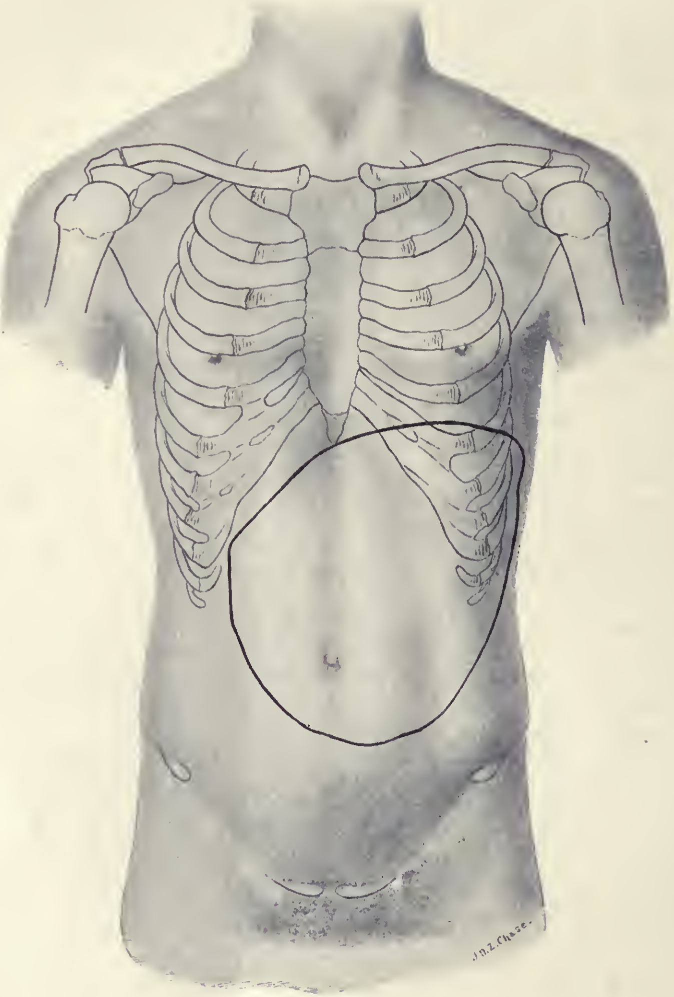
Examination at this time showed the lungs, heart, and abdominal viscera, except the stomach, to be free from disease. The urine was somewhat scanty and high-colored, but showed nothing upon examination except that the specific gravity was above the normal. He was slightly sallow and under weight for a man of his height.

His tongue was covered with a thick, white coating. He complained of fulness in the epigastrium and pain several hours after eating. No vomiting. There were eructations about an hour after eating of bitter, sour fluid, and an almost constant sour taste in the mouth. There was some insomnia and also mental inactivity, and considerable frontal headache. No muscular twitching; no symptoms of tetany. Knee-jerks were normal.

Examination of his stomach: By percussion the pylorus appeared to reach somewhat to the right of and below the umbilicus. The abdominal walls were relaxed. There were no peristaltic waves visible. About the lower border of the stomach there was distinct splashing. No point of tenderness and no tumor could be found. His stomach was washed out before breakfast, and by aspiration about 100 c.c. of fluid, mixed with mucus, were withdrawn. It was always difficult to withdraw the contents, and aspiration had to be resorted to. Expression always failed. Inflation showed the organ to extend below the umbilicus and three finger-breadths to the right.

An Ewald breakfast (a roll and one-half pint of fluid) in one hour gave 100 c.c. of fluid. Hydrochloric acid was present in small amount; lactic acid present. Some mucus, no blood, and no sarcinæ. The water flowed in easily, but it was difficult to empty the stomach and almost impossible to cleanse it thoroughly.

FIG. 1.



By inflation.

His work continued hard, and the aim of treatment was to enable him to graduate, and then to hope to relieve him by rest. However, he greatly improved, and by April 25th, while his stomach-wall was still much relaxed, as shown by inflation (Fig. 1), there was no fluid before breakfast, and the evidences of fermentation were almost gone

He slept better and could concentrate his mind to do more work. Examination of his gastric contents after a test-meal showed hydrochloric acid present, but no lactic acid.

Just after graduation, in June, his stomach was still relaxed, and he was in practically the same condition as in April. He was referred to Dr. Zimmerman in April, who reported considerable eye-strain, hypermyopia, and astigmatism. Correction by glasses relieved his headache, but seemed to have no marked effect upon his gastric symptoms. After going home he reported himself much improved by rest and the change of air.

Case III. (J. H. M. and J. D. S.).—Male, aged twenty-eight years; medical student. Born in Pennsylvania; single. Family history is good except that mother has suffered much from acute articular rheumatism. One sister has had frequent attacks of rheumatism.

The patient's habits are good. Never took alcohol or smoked. No history of venereal disease. The patient had scarlet fever and diphtheria in childhood. Had an attack of lumbago at twenty-six years, but no other rheumatism. At sixteen years he had an attack of "nervous prostration" that lasted for six months, during which period he suffered considerably with weak, slow, and irregular heart and palpitation. His digestion was very poor, but the bowels were regular, and he had no fever. He recovered and became very strong and well, and led a healthy out-door life. He weighed 170 pounds.

He entered college in 1892, in perfect health. He had to work his way by canvassing in the summer, and this, with hard studying, almost broke him down in February, 1894, but he managed to graduate. He was suffering at that time with about the same symptoms as at present —insomnia, dulness, and inability to work, fulness in epigastrium after eating, but no constipation.

After graduation he came up quickly under complete rest, but had recurrences of the same trouble at intervals, when working hard, for the next two years. His meals were irregular and food not always of the best, and he has always eaten rapidly, with insufficient mastication.

After a summer of very hard work at his business he entered the medical school. In November he gave out completely. His symptoms were those given, but aggravated.

After a period of rest at home, with proper diet, he recovered a fair degree of health. He returned to the medical school, and by great care managed to get through the next two years, studying hard and working in the summer.

He came under observation May 3, 1899. He then had insomnia, muscular relaxation, and pains throughout the body. There was considerable pain in the epigastrium and left hypochondrium an hour or so after eating. There was much gurgling and some eructations of sour, bitter material, but no vomiting. There was considerable constipation. He suffered from attacks of bradycardia alternating with palpitation, especially after eating, and had considerable vertigo and dimness of vision.

Urine. Highly colored, lately rather scanty, and occasionally scalds him. Examination of it shows nothing abnormal, except a high specific gravity and an excess of indican. Thirst was not marked; and appetite fairly good.

Examination. Was not particularly emaciated, but sallow. He weighed 130 pounds. No symptoms of tetany. Knee-jerks present, and pupillary reflexes normal. Teeth in fairly good condition. Tongue was heavily furred. Examination of lungs and heart showed them to be healthy. Liver, spleen, and kidneys appeared to be of normal size and location. There was no sign of either gastroptosis or enteroptosis.

Examination of the stomach showed considerable splashing about the level of the umbilicus. By percussion the pylorus appeared to be below and to the right of the umbilicus. The walls, as felt through the abdominal walls, seemed relaxed. No peristaltic wave could be invoked. No tumor could be discovered.

The stomach-tube passed before breakfast brings out 150 c.c. of greenish fluid. After an Ewald breakfast of several slices of toast and 500 c.c. of weak tea and milk, 100 c.c. were recovered by aspiration. The contents of the stomach could never be expressed, and were seldom evacuated through the tube by vomiting, but always had to be removed by aspiration. Water in lavage flowed in readily, but it was difficult to recover it.

Chemical examination of the fluid obtained after a test meal on several occasions showed the total acidity to be 54. Hydrochloric acid present and lactic and butyric acids absent. There was always much mucus raised through the tube.

Inflation of the stomach showed much relaxation. The result of this procedure varied very little while he was under observation.

The patient finished his year without much trouble, and seemed to gain slightly. After a summer in the open air he has greatly improved. His stomach now does not reach to the umbilicus, though he still suffers from fermentation. The stomach-tube shows no fluid in the fasting stomach before breakfast, and after an Ewald test breakfast 25 c.c. are obtained. The chemical examination is about the same as before. He has gained sixteen pounds.

CASE IV. (J. H. M.)—Male, aged twenty-two years; dental student. A native of the United States. His family history is good. Father, mother, one brother, and one sister alive and well. One sister died in babyhood. No rheumatic or tubercular family history.

The patient had pertussis and measles in childhood. Had also had mild attacks of influenza and a couple of attacks of chills and fever. He has used alcohol in moderation; has not had any venereal disease, but from his seventeenth year has smoked to great excess, mainly cigarettes, and has also chewed tobacco. In October, 1896, he began to experience palpitation and irregularity of the heart's action.

Soon signs of gastric disturbance were added, consisting of acid eructations, fulness after meals, no nausea, and regular bowels. He gradually grew worse, and in the fall of 1897 grew very anæmic, and entered the Presbyterian Hospital under Dr. Musser's care. He continued the use of tobacco until his admission into the hospital.

A note of the examination made then is as follows: "Patient has slept well since admission and has been very comfortable. There have been occasional eructations of acid material, but these have now disappeared. He looks very anæmic, but is always bright and cheerful. On one occasion in giving lavage he retained 4500 c.c. of water. This amount, however, caused him no inconvenience. His stomach has been dilated with air, and the stomach tympany was mapped out by auscultatory percussion."

The result showed that the greater curvature extended two fingerbreadths below the umbilicus; the pylorus was on the right mid-clavicular line, on the costal margin, and the lesser curvature was on the level of the ensiform.

His blood-count upon January 24, 1898, was: Red cells, 4,100,000; white cells, 6000; hæmoglobin, 62 per cent. While in the hospital he was free from fever. The urine was about normal in amount and specific gravity.

Under appropriate treatment—lavage, rest, massage, and discontinuance of tobacco—he greatly improved. The gastric symptoms lessened, and on February 4th his blood-count was as follows: Red cells, 4,210,000; hæmoglobin, 72 per cent.

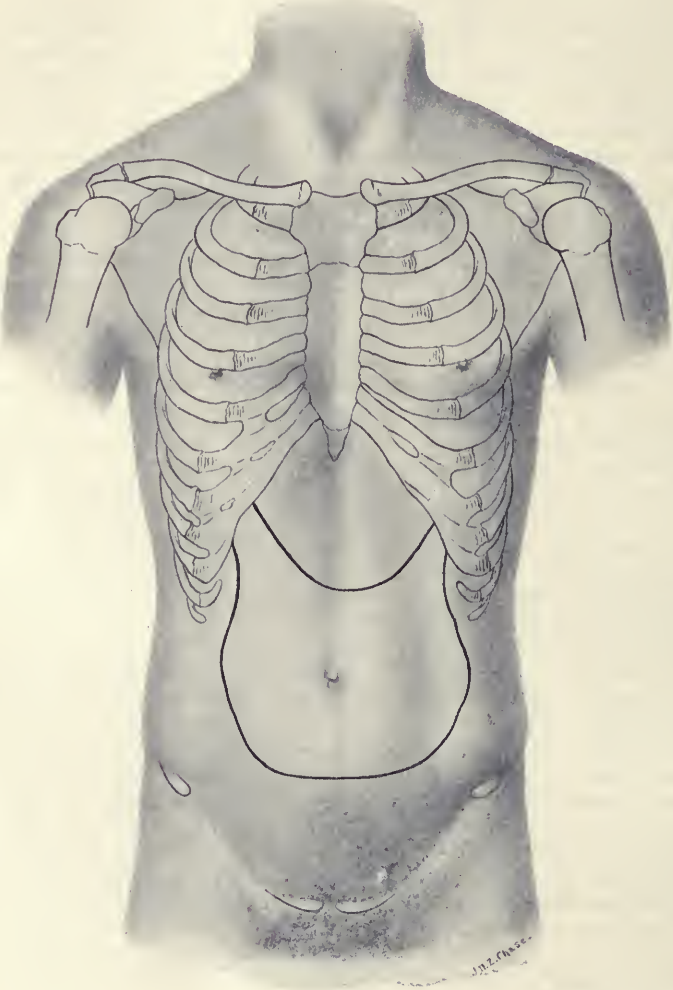
After leaving the hospital he returned home and led an active outdoor life, with regular habits and without smoking to excess, until the autumn of 1898, when he again entered the dental school. He had taken fair care of himself, did not study excessively, and did not smoke to excess, except occasionally. In April, 1899, he again came under observation, complaining of some discomfort after eating, and occasionally acid eructations, but was feeling fairly well. The stomach-tube was passed, and his stomach was found to be empty before breakfast. He retained a pint and a half of water, which was recovered with ease. One hour after an Ewald breakfast but 25 c.c. of fluid could be recovered, mixed with much mucus. No free hydrochloric acid; no lactic acid. When the stomach was filled with air considerable dilatation was found. With attention to diet and simple medication his gastric symptoms soon disappeared entirely.

Case V. (J. H. M. and J. D. S.).—Male, aged twenty-two years; medical student. His mother and father are living and well, except that his mother has had some slight stomach trouble, evidenced by occasional attacks of gastritis. One brother has a weak stomach, and was troubled in much the same way as the patient is when at the same age. He has four sisters, all healthy.

The patient was perfectly well up to the age of fourteen years He had no diseases of childhood He went away to school at this age, and soon began to have occasional attacks of acute pain in the stomach, with headaches and constipation. While at school he was very careful in his habits, but in the summers he used alcohol and tobacco to excess. He had never vomited. The symptoms gradually grew worse until he came under observation, in October, 1899. During the summer he had been washing out his own stomach once or twice a week, with considerable relief of his symptoms. He then had occasional pain in the epigastrium, eructations of gas and bitter material after meals, constipation, headache, and inability to concentrate himself upon his studies. He has always been a rapid eater. He had some muscular insufficiency of his eyes for several years, and up to a year ago—when his eyesight was corrected by glasses—suffered much from granular lids and could not use his eyes at night.

The examination showed that his heart and lungs were healthy, and that the kidneys, liver, and spleen were in their normal positions. No fluid was found in the fasting stomach before breakfast. The inflow was very easy and the outflow difficult. The stomach contents were removed sixty minutes after an Ewald test breakfast, and 70 c.c. were recovered. Hydrochloric acid was present, lactic acid absent, butyric acid absent. The total acidity was 60. Inflation showed that there was considerable gastroptosis. The pylorus was in the mid-clavicular line, at the costal margin. The lesser curvature was half-way between the ensiform and umbilicus. The greater curvature was three fingerbreadths below the umbilicus, showing that there was considerable dilatation as well as atony (Fig. 2). The patient could not take more than 1000 c.c. of water in his stomach without discomfort.

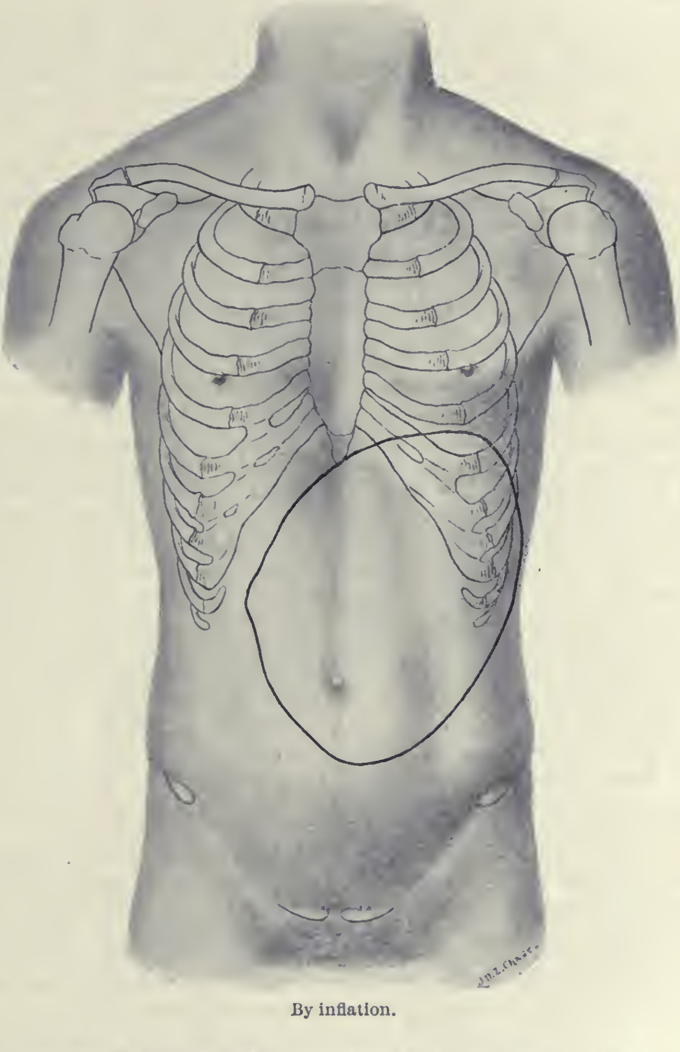
FIG. 2.



By inflation.

CASE VI. (J. H. M.).—Male, aged twenty-two years; law student. His mother is neurasthenic, but with this exception the family history is good. No bad habits; no smoking or stimulants. Had typhoid fever in 1895, and since then had had some bowel disturbance, which increased in 1898 to an extreme degree. The symptoms began with constipation, which soon turned into chronic diarrhœa. During this time he had several large movements a day, containing mucus and blood. When first seen, in February, 1899, he had one stool a day, which contained at first fecal matter, and then became very loose. Ever since the attack of typhoid fever quoted above he suffered with eructations of gas and fluid, beginning some little time after meals, and with fulness in the stomach after eating. He was very nervous, easily exhausted, worn and emaciated, and had lost considerable weight. He

FIG. 3.



By inflation.

was unable to study. He had a marked splashing sound, and tympany extended to the right of the median line.

The stomach-tube brought away considerable undigested and fermented food, indicating considerable gastric atony. Inflation showed that the stomach was much dilated. The greater curvature was three finger-breadths below the umbilicus, and the lesser curvature at the ensiform cartilage. There was consequently dilatation with no gastroptosis (Fig. 3).

CASE VII. (J. H. M.).—Male, aged nineteen years; medical student. His family history is very good. The patient has always been healthy, except that he has been somewhat troubled with constipation and flatulency at various times. He has led an active life, a good deal of the time in the open air. He has smoked considerably during the past year. There was no trouble with his eyes.

The present illness began with flatulency, accompanied by pain and tenderness around the umbilicus. The pain gradually spread over the whole abdomen. It seemed to be of a nervous character, becoming much more severe during excitement of any kind. There was no nausea or vomiting at any time. From August, 1898, to October, 1898, he lost twenty-two pounds, and became much weakened.

The stomach-tube brought away a considerable amount of fermented material from the stomach. Upon washing out the stomach two hours after a test breakfast consisting of meat and toast, aspiration brought away much undigested food and a considerable amount of fluid. In washing out the stomach the inflow was very rapid, causing an eddy in the funnel, but it was extremely hard to withdraw the gastric contents or to siphon away the washage water. Inflation showed considerable dilatation. The greater curvature extended two finger-breadths below the umbilicus, and the cardiac end extended up to the fifth rib on the anterior axillary line, and the lesser curvature was on a level with the ensiform.

CASE VIII. (J. H. M.)—Male, aged twenty-four years; college student; white; single. His mother has asthma and hay fever, but otherwise the family history is very good. The patient smoked to excess, and used beer and probably other stimulants at least injudiciously. He did not overwork. He had been healthy all his life, with the exception of an attack of chronic malaria three years ago, which lasted for one year. For two years he had had gastric disturbance, fulness after eating, eructation of gas and bitter material. His thirst had been somewhat excessive, and the urine had been scanty and of high color.

The stomach-tube was passed forty minutes after a small test breakfast, and 25 c.c. were recovered. A large amount of bread and fluid came with the washing. The odor was slightly sour; total acidity 40; free hydrochloric acid was present. The total hydrochloric acid was 8. There was no lactic or butyric acid. Peptones and starches were present, and a trace of bile. The water ran in rapidly and siphoned out with difficulty. The greater curvature was three finger-breadths below the umbilicus, and the pylorus was two-thirds of the way to the right midclavicular line. The lesser curvature crossed the ensiform. There was no gastroptosis. The patient suffered much from a mental inactivity and weakness.

When the stomach-tube was passed he had a clonic spasm of the extensor muscles of the arms and legs, with external rotation. Trousseau's sign was not obtained, and there was no response when stimulating the facial nerve.

Diagnosis. In establishing a diagnosis of motor insufficiency the following signs are of most value:

1. The presence of undigested food and fluid in the stomach fasting over night. The stomach is never entirely empty, as was the case in all but one of our series. This symptom is recognized by all authors to denote a decided lack of motor power. The rule laid down by Riegel in this connection is that when food and fluids are found seven hours after a meal the stomach is lacking in motor power.

2. The manner of inflow and outflow of water when the stomach-tube is used is characteristic. The water flows in with great ease, causing a whirlpool in the funnel, and was removed with great difficulty. The rapidity with which the water enters and the difficulty with which the contents of the stomach are removed appear to us to be an evidence of weakness in the gastric muscle. In enlargement of the stomach due to obstruction of the pylorus the gastric contents can be expressed with more or less ease. Water flows in slowly and flows out with great readiness. This is due to the hypertrophy of the muscle-wall of the stomach caused by its efforts to overcome an obstruction at the pylorus. On the other hand, if the walls of the stomach are relaxed from inherent weakness, then water flows in readily, the contents cannot be expressed, and it is difficult to empty the stomach entirely by siphonage.

3. Inspection of the abdomen—a point upon which Osler and Allbutt lay much stress—has been, in our experience, a sign of somewhat negative value in cases of dilatation from atony. It is possible that they refer more especially to cases of dilatation from obstruction when they speak of marked prominence in the right upper quadrant of the abdomen. All of our series, in which there was no gastroptosis, showed a slight protrusion in this region, and one case—Case V., in which there was considerable gastroptosis—showed a slight flattening in the epigastrium, with some protrusion at the level of the umbilicus.

4. In none of our series were peristaltic waves seen through the abdominal wall, nor could they be invoked by stimulation. This is another point in favor of the view that the dilatation was due to weakness of the gastric muscle. In cases in which the stomach enlarges by reason of obstruction in the pyloric end peristaltic movements are very frequently observed. This is explained by considering the fact that the gastric muscle in cases of dilatation from obstruction is much stronger and more active than in cases of dilatation from atony.

5. Riegel and Allbutt lay stress upon the fact that in atonic conditions of the stomach-wall palpation may throw considerable light upon the condition of the stomach. The walls of the stomach in such cases, as felt through the abdominal wall, are relaxed and flabby. To obtain

this sign, however, the abdominal parietes must be exceedingly thin and relaxed—a condition that was not present in any of our cases, and, consequently, we could not consider it of much value.

6. Evidences of fermentative processes in the stomach were almost invariably present. These were eructations of gas or bitter material, muscular weakness, lack of mental activity, and other signs of auto-intoxication. There were usually insomnia, inability to work, and diminished power of concentration. Some muscular pain and twitching were present in all of our cases. Case VIII. had an attack of muscular spasm that might be considered tetanoid, although the symptoms were not entirely characteristic. It always occurred during lavage. In other cases no symptoms of tetany were observed, as evidenced by our failure to obtain any disturbance in stimulating the facial nerve or to get Trousseau's sign.

7. The urine was almost always concentrated and small in amount. The fact that water is not absorbed by the stomach-wall would seem to make the scantiness of the urinary secretion a sign of value in making the diagnosis of motor insufficiency, and is so recognized by the principal authorities.

In all of our cases the appetite was good. Thirst was moderate, and the bowels usually constipated.

In determining the size and position of the stomach we consider inflation with air through the stomach-tube by means of an ordinary Davidson syringe to be the easiest and most reliable method. While we recognize the value of Dehio's procedure of causing the patient to drink measured quantities of water, and percussing the lower border of the stomach before and after, we think this method has the serious objection that by its use the position of the lesser curvature cannot be definitely determined. Moreover, its only advantage in the determination of the position of the greater curvature is that it does away with the necessity of passing the stomach-tube.

The amount of water that can be passed into the stomach may also be looked upon as a sign of value in determining the existence of dilatation, but it cannot be considered absolutely reliable. The maximum capacity of a normal stomach, which is placed at 1500 c.c. by Ewald and 1680 c.c. by Ziemssen, has been shown by Pepper and Stengel to be in some cases as high as 2600 c.c. The mental attitude of the patient seems to be a considerable factor in determining the capacity of the stomach by this method, and some will complain of fulness before the amount of water poured through the tube reaches a quantity at all commensurate with the degree of dilatation that inflation with air shows to be present. It must be considered, too, that the stomach, about to be filled with water, may contain considerable gas, the result of fermentation, which cannot find an outlet along the stomach-tube or through the pylorus. This may cause considerable distention before the water enters, and, naturally, the amount of water required to produce a sense of fulness would be much too small to indicate correctly the capacity of the stomach. Cases II., III., IV., VI., VII., and VIII. held at different times quantities of water varying from two to four litres, and this must be considered an evidence of increased capacity. Case V., on the other hand, could take but 1000 c.c. without discomfort, although there seemed to be some dilatation, as shown by inflation, and the signs of motor insufficiency were well marked.

The gastric secretion was not disturbed to a marked degree in any of our cases. In none was there hyperacidity, and free hydrochloric acid was found in all at some time while under observation. Lactic acid was present occasionally in Case II., but hydrochloric acid was usually present as well.

One of the most comprehensive classifications of the varieties of this condition is that given by Hemmeter, based upon the work of Riegel and Boas. It is as follows: First, simple gastric atony or motor insufficiency without dilatation. Second, atonic dilatation due to relaxation of the gastric walls without pyloric stenosis. Third, secondary dilatation due to pyloric stenosis. But to classify the cases of dilatation into those of dilatation from atony, and dilatation from obstruction, as indicated by Pepper and Stengel, seems all-sufficient. From the study of the general symptoms given above, and of the evidence of the size and position of the stomach obtained by inflation, we consider that all of our cases are to be placed under the second heading of Hemmeter's classification or under the first heading of Pepper and Stengel. It is to be remembered that in Case V. there was also some gastroptosis.

In several cases the occasional absence of hydrochloric acid appears to indicate a considerable amount of chronic gastritis that probably antedated the motor insufficiency. The relations of the two conditions will be considered under the heading of etiology.

The differential diagnosis does not seem to be difficult. It is necessary to exclude pyloric obstruction from malignant disease, from scar formation due to ulcer, or from spasmodic contraction and duodenal stenosis. The grounds upon which this diagnosis was based are as follows: 1. The absence of a history of gastric ulcer and hemorrhage from the stomach. 2. The age of all of our cases, being too young for cancer. 3. The absence of any sign of peristaltic action in the stomach-wall as seen or felt through the abdominal walls, denoting a weakness of the muscle and not the usual hypertrophy seen in the early stages of pyloric obstruction. 4. The rapid inflow of the water through the stomach-tube, and the difficulty of removal of the stomach-contents, showing lack of power in the stomach-wall. 5. The absence of any sign of tumor. 6. The absence of bile in the stomach contents, indicating duodenal stenosis. 7. The presence of hydrochloric acid in all the cases at some period of observation.

The question of the existence of congenitally large stomach, or megalogastria, must also be considered. However, the symptoms of motor insufficiency were so decided that it must be assumed that the enlargement in every case was due to dilatation.

ETIOLOGY. In his article in Nothnagel's *System*, Riegel says: "The stomach weakness may be only a part of the manifestation of a general lack of strength, be it congenital or acquired. We see under the influence of severe exhaustion the evidences sometimes of irritation and sometimes of paralysis of the most varying nerve plexuses. There is no wonder, then, that under the same conditions the appetite may suddenly fail in some cases, while in others the peristalsis may be increased, or, in still others, atony and paralysis of the stomach may occur." It is seen that Riegel recognizes a variety of atonic motor insufficiency due to severe bodily and mental strain without a precedent history of chronic gastritis. He calls attention to the fact that the tendency to weakness of the stomach may be congenital, either on account of a similar localized weakness of the parents, or on account of an hereditary general bodily lack of resistance. Most authorities state that a chronic gastritis is a very frequent cause for motor insufficiency in dilatation. The vicious circle is established from lack of nutrition due to the gastritis, and the muscular layers of the stomach are affected either by an extension of the chronic inflammation from the mucous membrane of the stomach or as a result of general impairment of the bodily strength. Clifford Allbutt says in this connection: "From my own experience I should find it difficult to say whether catarrh or primary atony of the stomach were the commonest cause of dilatation of the stomach not dependent on pyloric stenosis or constitutional disease. A gastric catarrh, by reducing the value of the gastric secretion and promoting fermentation, is a potent means of setting up dilatation."

The etiology of each case will be considered in outline: Case I. The father was dyspeptic and the mother decidedly neurotic and gouty, and it is possible that the patient inherited the so-called tendency to a weak stomach; but, at all events, it is likely that his resistance was not great enough to stand the confined life and mental strain of a trying course of study. In Case II. there does not seem to be any predisposing cause, such as heredity, to explain the condition. It is probable that badly selected food and hard work before he entered the University produced a chronic gastritis, which led to dilatation from atony, and that the strain of hard study aggravated the condition. Case III. much resembled Case II. The effort of working his way through college and the medical school produced a degree of nervous exhaustion that would seem to be responsible for his condition. Case V. would appear to be an instance of a congenital weakness of the tissues supporting the stomach, which produced a considerable degree of gastroptosis. It is hard to say whether this gastric atony preceded or followed the displacement of the stomach. The early occurrence of this condition would indicate some congenital factor in its causation. It is possible that the gastroptosis played some part in the production of the dilatation, whether from traction and kinking of the duodenum or from some other cause. His occasional excesses in tobacco and alcohol probably aggravated the condition. In Cases IV., V., VI., and VIII. there was a history of excessive use of tobacco and of the at least injudicious use of other stimulants. These conditions combined probably caused a chronic gastritis, which resulted in considerable atrophy of the muscular layers and dilatation. Bouveret states that excessive smoking may in itself cause gastric insufficiency. Riegel, in commenting upon this statement, says that it is probable that the direct results of such narcotics is gastritis, which is followed by atony of the stomach-walls. Case VII. is probably one of dilatation from atony occurring during the course of or in the convalescence of an acute illness. The symptoms of intestinal and gastric disturbance can be traced directly to the attack of typhoid fever that occurred two years before he came under observation. It is well known that the strain of such an illness is an important factor in the causation of weakness in the gastric muscle.

It must have been observed in a review of the series of cases that the eyes were at fault in all but Case VII. It is an unsettled question whether such a condition is one of cause or effect, or whether the two are simply combined symptoms of trouble arising from a common cause in the nervous symptom. It is our experience that correction of eyesight by glasses appears to have a beneficial effect.

A boarding-house table, leading, as too many of them do, to careless habits and to great haste in eating, and in some instances furnishing a too great proportion of fried and fatty foods, renders it extremely difficult to treat such cases of motor insufficiency in students, and is probably a factor in the causation of the condition.

Our conclusions may be briefly given: 1. The symptoms upon which most reliance can be placed in determining the presence of gastric motor insufficiency are: (*a*) The presence of fluid and food in the stomach fasting over night; (*b*) the ready entrance of fluid through the tube and difficulty in the return flow; (*c*) the absence of visible gastric peristalsis; (*d*) evidences of fermentation and intoxication by the products thereof; (*e*) thirst, and (*f*) scanty and concentrated urine.

2. In determining the position and size of the stomach, by far the most certain method has been inflation by air through the stomach-tube; auscultatory percussion, Dehio's method, and determining the

capacity of the stomach by the amount of water required to produce a sense of fulness, while signs of value may lead to error.

3. It may be inferred from the somewhat small number of cases just reported that the condition is not uncommon in students. An analysis of the etiological factors is as follows: (*a*) Myasthenia caused by chronic gastritis from the abuse of alcohol and tobacco, four cases; (*b*) myasthenia from deficient innervation, two cases; (*c*) myasthenia, probably of congenital origin, one case; (*d*) myasthenia occurring in the course of acute disease, one case.

THE SURGICAL TREATMENT OF ACUTE PUERPERAL SEPSIS, WITH SPECIAL REFERENCE TO HYSTERECTOMY.[1]

BY HIRAM N. VINEBERG, M.D.,
OF NEW YORK.

IT is not without considerable diffidence that I bring the subject of the surgical treatment of acute puerperal sepsis before you, feeling only too keenly that its gravity and importance call for some exponent who has had a more extensive and a longer experience than I have had. But my work in this direction has met with such strong opposition, and has been subjected to so much unfavorable criticism, open and covert, and my attitude has so often been misunderstood, that I am desirous of an opportunity to define, as clearly as it is possible within the scope of this communication, the views that have guided me in my work and to elicit a discussion of them by this representative body of men.

The first point to determine in the discussion of this subject is, What clinically constitutes acute puerperal sepsis?

It is held by some that the term "acute" should be applied only to those cases that set in with severe symptoms during the first three days of the puerperium, and which usually terminate fatally any time between the fifth and the tenth day. Cases protracted beyond this period they would designate as "chronic." The importance of this definition becomes manifest when the question of radical surgical intervention is mooted. The adherents of this definition argue that the first class of cases end fatally no matter whether they are operated upon or not. In fact, according to one of the critics, all that a radical operation can do in these cases is to hasten the inevitable fatal termination.

The second class of cases, they say, run a "chronic course;" they usually get well of themselves, or if an operation is indicated it can be indefinitely delayed, and comes under the heading of those that are done for pelvic affections of a non-puerperal origin.

---

[1] Read before the American Gynecological Society, May, 1899.

It seems to me that such a definition is untenable and is unwarranted by clinical facts.

A truer definition, to my mind, of "acute" puerperal sepsis would be an infection that takes place either shortly before, during, or immediately after labor—that manifests itself by symptoms during the first week of the puerperium, and in which the symptoms persist continuously, with variable severity, until the disease ends in death, in a cure, or passes into a chronic state.

Supposing a woman at a non-puerperal period should acquire a streptococcus or staphylococcus infection of the pelvic organs and run a continuous fever curve say from 101° to 104° or 105°, and a pulse from 100 to 130 or 160, would we say she had an "acute" disease or a "chronic" one? I am sure there would be but one opinion regarding the "acute" character of the case. We would consider the case "chronic" only after the fever and rapid pulse had subsided and the woman still presented a lesion of the pelvic viscera. Why, therefore, should we apply a different standard to an infection acquired at the puerperal period?

It is not my desire, however, to split hairs on the subject of definition. The practical question, after all, is to determine whether *all* fatal cases of acute puerperal sepsis run their course within a given period (five to ten days).

One's experience and a superficial glance at the literature on the subject ought to convince one that such is far from being the case.

The following are a few data collected at random from the literature for the past few years:

Gaertner[1] reports a case in which death occurred on the seventeenth day of the puerperium.

Bayard Holmes,[2] one case in the seventh week.

Hensoldt,[3] one case on the fifteenth day; one case on the twenty-third day; one case on the sixteenth day; one case on the twenty-sixth day (from fibro-purulent peritonitis).

Schwarz,[4] one case on the twelfth day (from purulent peritonitis); one case on the nineteenth day.

Hünermann,[5] one case on the fifty-fifth day; one case on the seventeenth day; one case on the eleventh day (from peritonitis); one case on the twenty-sixth day; one case on the eighteenth day; one case on the fortieth day (in this case had fever on the fourth day, chill on the seventh day, on which day some placental residue was found in the uterus and removed); one case on the eleventh day (peritonitis); one case on the thirty-eighth day; one case on the fourteenth day.

---

[1] Archiv für Gynäkologie, Band xliii. p. 252.

[2] Journal of Medical Association, 1895, No. 23, 1895—a very valuable and instructive paper.

[3] Charité Annalen, 1890–1891.

[4] Ibid., 1891–1892.

[5] Ibid., 1892–1893.

Hockstetter,[1] one case on the thirty-sixth day; one case on the twenty-first day (from peritonitis); one case on the fourteenth day (chill and high fever on the ninth day, only slight fever before; removed fragment of decomposing placenta on this day); one case on the eleventh day (from purulent peritonitis).

Hockstetter,[2] one case on the twelfth day; one case on the twenty-fifth day.

Klauer,[3] one case on the twenty-ninth day; one case on the forty-third day.

Klauer,[4] one case on the twelfth day (from peritonitis); one case on the seventeenth day; one case on the twenty-second day (from peritonitis).

Velde and Volkmann,[5] one case on the eleventh day; one case on the twenty-fourth day (from peritonitis); one case on the twenty-seventh day.

Widal,[6] one case on the eighteenth day.

P. Ernst,[7] one case on the seventeenth day.

Hoff,[8] one case on the twelfth day.

Brieger,[9] one case on the eleventh day; one case on the twenty-second day (chill and fever on the tenth and eleventh days).

Cannon,[10] one case on the twentieth day; one case on the twenty-eighth day.

A. de Pourtales,[11] one case on the twenty-eighth day (from suppurative peritonitis); one case on the twenty-fourth day.

There are accordingly thirty-eight cases in which death occurred from the eleventh to the fifty-fifth day, or on an average of twenty-three days. Among these there are ten cases of septic peritonitis (of all puerperal lesions the most rapidly fatal) in which the fatal termination occurred from the eleventh to the twenty-eighth day.

Another argument brought forward against radical intervention is that so long as there is no general or constitutional infection the patient will get well without an operation, and once general infection has occurred it is worse than useless to remove the uterus and adnexa with the hope of arresting it. You might as well think, it is said, of doing this by cutting off the patient's head. An obvious reply to this is that intervention is to be instituted before the local infection has become universal. But what warrant is there for the assertion that when the infection has reached the blood current, or, in other words, when systemic infection has occurred, the case is hopeless. Has the human economy no powers of resistance to bacterial invasion?[1] Daily clinical experience teaches us that fortunately it has to a very great extent; but, of course, there is a limit to this power, and this circumstance forms one of the strongest arguments in favor of timely surgical intervention. Cut away a gangrenous appendix, and the patient may get well, though the poison has pretty well surcharged his system; leave the gangrenous mass within his abdomen, and the poison in a short time will kill him. Remove a uterus, the walls of which are a breeding-place for bacteria, and the patient may get well, though she shows all the clinical and bacteriological signs of systemic infection; fail to do this, and it is more than likely that the reinforcements of the enemy from the reserve army in the uterus will in time destroy everything before it.

---

[1] Charité Annalen, 1892–1893.
[2] Ibid., 1893–1894.
[3] Ibid., 1894–1895.
[4] Ibid., 1895–1896.
[5] Ibid., 1896–1897.
[6] Thèse, Paris, 1889.
[7] Virchow's Archiv, Band cxxxiii.
[8] Dissertation, Strasburg, 1890.
[9] Charité Annalen, 1888.
[10] Deutsche Zeitschrift für Chirurgie, 1893.
[11] Archiv für Gynäkologie, Band lvii., Heft 1.

When called to a case of acute puerperal infection it is my custom to make a thorough examination of the perineum, vagina, and cervix for any wounded surface. If any is found it is inspected very carefully. The uterus, adnexa, and pelvic tissues are subjected to a thorough bimanual examination. The result of such an exploration, together with the prior history and the present condition of the pulse, temperature, and tongue, are carefully studied, with the view, if possible, of ascertaining the point of entrance of the septic material. If an ugly-looking wound is found at the perineum, or in the posterior vaginal wall, or high up in the vault, extending on either side from a deep tear in the cervix, and the uterus is found fairly well contracted and corresponding in size to the normal one at that period of the puerperium, the uterine cavity is religiously left undisturbed, I then direct my whole attention to the treatment of the infected wounded area. It is not necessary to enter into any details as to the procedures followed any further than to say that the same principles of drainage and frequent irrigation with some antiseptic solution are observed as one would in a septic wound elsewhere.

These irrigations should be carried out by the physician himself, two or three times in the twenty-four hours. In the intervals of the doctor's visits the irrigation may be entrusted to an intelligent and careful nurse.

Of course, it goes without saying that the general treatment of the patient is not to be neglected, but upon this point we are all pretty well in accord.

Cases are sometimes met with in which there may be some doubt whether a double infection does not exist—one of the vaginal canal and one higher up, in the interior of the uterus. In these instances the patient is anæsthetized and the uterine cavity is thoroughly explored, either with the finger or the curette, or with both, the greatest care being taken not to carry any of the infection from the vaginal wound into the uterus. If no evidence of uterine involvement be found the uterine cavity does not receive any further attention; but if there are positive signs of such involvement in the existence of a large, flabby uterus and placental and decidual residue, or in débris of a fetid odor, the uterus is subjected to a thorough curettage and provision made for efficient drainage. This is best carried out by introducing a couple of large rubber catheters and leaving them *in situ*. In this manner the uterus can be frequently irrigated without disturbing the patient and without the fear of carrying up any infection from the vagina. The catheters should be removed once in every twenty-four hours, so as to cleanse them. With the aid of a bivalve speculum they can be reintroduced without coming into contact with the vaginal or perineal wounds.

---

[1] Cases of puerperal sepsis have been reported in which the pathogenic germs were found in the blood and the patients recovered, showing that systemic infection is not necessarily fatal. (F. Gärtner's Centralblatt für Gynäkologie, 1891, No. 40.)

A brief narration of the following case will demonstrate the practical execution of the above outlined procedure:

Case I.—I was called to a young primipara, who, nine hours before, had been delivered, by the vigorous and prolonged use of the forceps, of a child in an occipito-posterior position. The woman, at the time of the visit, was in profound shock, with a very small and rapid pulse and a temperature of 101°. I was enabled to make only a very superficial examination, which disclosed a very deep tear, extending from the left side of the cervix through the vaginal tissues down to the pelvic wall, running downward along the whole length of the vagina, through the rectal sphincter, and involving about two inches of the rectum. The wound had an ugly, unhealthy appearance. Stimulants were given to combat the shock, and twenty-four hours later, when the patient had rallied and there were still signs of marked sepsis, she was anæsthetized and subjected to a searching examination. First, the vaginal wound was thoroughly cleansed and completely covered with iodoform gauze. Before proceeding to the next step I vigorously disinfected my hands. The cervix was then exposed and seized with a vulsellum, and the whole interior of the uterus was now gone over with a large curette. Nothing being found, the uterus was merely irrigated with a boric acid solution and afterward left alone, excepting that it was examined daily through the abdominal wall to note if involution was progressing satisfactorily. Owing to the obesity of the patient and to the voluminous vagina, it was difficult to obtain satisfactory drainage from the upper part of the wound, where there was a deep wound leading down to the pelvic wall. The edges of the wound were kept apart by strips of iodoform gauze, which were frequently changed, and the whole wound was irrigated with various antiseptic solutions. For two weeks the patient's condition was critical in the extreme, the temperature ranging from 102° to 105° and the pulse from 120 to 130. At the end of this time the wound began to assume a less unhealthy appearance, and the temperature and pulse gradually decreased. It took about two weeks longer before the wound began to show healthy granulations and before the temperature and pulse became normal. There were no complications, no pelvic exudate, no phlegmasia dolens, the uterus involuted satisfactorily, the patient making a complete recovery. Three months later I repaired the tear of the cervix and of the rectum and sphincter, obtaining an excellent result.

There still seems to be a lack of unanimity among the profession as to the propriety of curetting the uterus when it is the seat of puerperal infection. All agree as to the advisability of removing any placental or decidual tissue or organized blood-clots that the uterus may contain when there are symptoms of sepsis, but the method of removal is the object of considerable diversity of opinion. Some hold that nothing but the finger should be employed. They apparently forget that just in this class of cases the manifestations of sepsis may be delayed as late as the eighth day, or even later, when the cervix may be fairly well closed, and when its forcible dilatation to the extent of being able to introduce the finger may not be feasible or be attended with great risk of tearing into the uterus.

The latter accident has happened time and again in the hands of experts. The opponents of the use of the curette base their objection upon the fear of breaking down with it the so-called "granulation zone," first described by Bumm, which acts as a barrier to the bacteria from penetrating deeper into the uterine tissues and thus spreading the infection. Others, again, say the curette may be used, but care should be taken not to break down this barrier that nature has provided. Of course, such advice is absurd. How is it possible to curette the endometrium with the sense of touch, or even with the aid of sight, and avoid a structure in it that is visible only with a high-power microscope? But the advice is in keeping with a great deal more that has been written on this subject. The fact is, as so frequently happens, that Bumm's observations have been misinterpreted. He found this zone fully developed only in the milder forms of uterine infection in the products obtained by curetting the uterus. These patients all recovered, and presumably they were bettered by the curetting, or at all events they were not injured thereby. In the severe and fatal cases of uterine sepsis the granulation zone did not exist at all or was only very poorly developed. The bacteria were found penetrating the whole thickness of the uterine wall and onto the peritoneum. The patients were not curetted, but yet they died.

As I stated on a former occasion,[1] "If Bumm's observations were to guide us in our clinical work we would refrain from curetting the *mild* cases of uterine sepsis, while in the severe forms they would constitute no contraindication, for we could not destroy that which did not exist."

In any given case, therefore, when by exclusion or by any other means we reach the diagnosis that the site of infection is within the uterus, it should, in my opinion, be subjected to a thorough curetting, whether it be with the finger or the curette or with a combination of both. In my opinion, the sharp curette in expert hands is less likely to do harm than a dull instrument or even than the finger roughly employed. If the curette removes considerable débris or thickened mucosa, and the temperature and pulse do not promptly fall to the normal, it is my custom to employ uterine irrigation with some antiseptic solution other than bichloride of mercury, which I deem a very dangerous agent to use.

---

[1] Practice of Obstetrics by American Authors (Lea Brothers, 1899), p. 250.

The irrigations may be carried out with two rubber catheters remaining *in situ*, as already described.

The majority of cases of uterine sepsis, even of the more serious type (not the so-called cases of sapræmia), will yield to this treatment if faithfully carried out. Within the past three years I have treated fifteen cases of pronounced uterine infection in this manner, and they all recovered.

But occasionally a case will be met with which does not respond to this plan of procedure. Despite the treatment, the patient grows more profoundly septic, as manifested by the pulse and other well-known signs, or there are evidences that the general peritoneum is becoming involved, or, in other words, to an experienced observer it is evident that the patient is not holding her own, she is losing ground rapidly, then, in my opinion, something of a more radical nature should be resorted to. What this "something" should be must vary with each individual case, but to be successful with it one ought not to wait until the patient is moribund.

In any case of uterine sepsis, therefore, if the above measures fail to bring about a satisfactory result, and no exudate can be detected in the pelvis to account for the increase of the septic manifestations, I deem it a justifiable and proper course to open the abdomen and be guided in one's further actions by the condition revealed. In most of these cases it will be found necessary to perform total hysterectomy.

Every conscientious operator will recognize the difficulties in determining the indications for so radical a procedure.

In a former paper[1] I stated that under the above conditions, if the pulse goes above 130, grows weak and small, hysterectomy is indicated. I am aware that such a rule is somewhat arbitrary, and I have myself not always adhered to it. There are a great many other things which must be taken into consideration, and which are difficult to describe, such as the general course the disease has run, the general appearance of the patient, the condition of the tongue, the character of the pulse, and so on.

It will be noted that in deciding upon my indications I seek no aid from a bacteriological examination of the interior of the uterus. My reason for ignoring such aid lies in the circumstance that it is extremely unreliable and unsatisfactory, even in the hands of expert bacteriologists. While I am willing to accept theoretically all bacteriology teaches us on the subject of puerperal sepsis from a practical stand-point, I heartily agree with Koblanck[1] when he says: "As a result of my own investigations and from a study of the literature I would assert that the bacteriological findings (in puerperal sepsis) can be used for our clinical purposes only with the greatest caution."

---

[1] New York Medical Journal, April 2, 1898.

If it were necessary a great many other authorities could be quoted who found streptococci in the vaginal and uterine discharges of puerperal sepsis of a very mild form. Further, the finding of the streptococcus in the uterine discharge does not necessarily argue that the case is serious and beyond surgical relief. Bumm[2] found the streptococci in the scrapings obtained by curettage in the cases of septic endometritis already referred to, and the patients all recovered. Döderlein[3] examined twenty puerpera with transient fever, and found streptococci[4] in the lochia in two cases. On the other hand, it has been positively shown that various other micro-organisms (staphylococcus pyogenes aureus,[5] bacteria coli communis,[6] bacillus aërogenes capsulatus,[7] gonococcus,[8] and an undescribed bacillus[9]) are capable of producing very severe and fatal forms of puerperal sepsis.

It will be proper now to narrate briefly the history of the cases in which the above line of action was carried out, following each case with a few comments, with the view of bringing out more prominently the points of discussion on the subject of hysterectomy for acute puerperal sepsis.

CASE II. (reported in full in the *New York Medical Journal*, April 2, 1898).—A young primipara had a normal and easy labor on May 31, 1897. On the sixth day of the puerperium had a severe chill, fever, and considerable abdominal pain. I saw her for the first time on June 8th (the ninth day of the puerperium); she then had a temperature of 103° (oral) and a pulse of 120, which was soft and compressible. There was no uterine discharge nor any fetor. The uterus corresponded in size to the gravid organ at the tenth week, and was not sensitive to pressure. The cervix was fairly well closed. The abdomen was flaccid, the adnexa apparently normal, and the parametria free from any exudate. The labia majora were œdematous, transparent, and resembled a hydrocele of the testicle in appearance. No wound of the perineum or of the vagina. I dilated the uterus gently and curetted with a sharp curette, removing considerable grayish-white fragments of tissue. Intra-uterine irrigations ordered, but the order was not carried out. Saw the patient again on June 11th. She had had several chills. She was apathetic, slightly delirious, temperature 103.5° (oral) and pulse 130. Slight distention of the abdomen and some tenderness over both iliac regions. The patient was now transported to St. Mark's Hospital. Intra-uterine douches were then regularly given, but the fluid for the most part returned clear. There was little or no uterine discharge, and despite cold sponging, free stimulation, and other approved methods of treatment for acute sepsis the patient steadily grew worse, so that on June 11th, at 6 P.M. (the twelfth day of the puerperium) her condition was as follows: Great apathy, delirium, temperature 105.5°, pulse 154, very small and compressible, abdomen considerably distended; deep pressure over the broad ligaments makes the patient cry out with pain. At 9 P.M. of the same day abdominal total hysterectomy.

---

[1] Zeitschrift f. Geb. und Gyn., Band xl., Heft 1, p. 85.

[2] Archiv für Gynäkologie, Band xl.

[3] Archiv für Gynäkologie, Band xxxi.

[4] It is recognized that there are different forms of streptococci with varying virulence, but with the most modern methods of investigation it has not yet been possible to differentiate them (Koblanck).

[5] Stünckmann-Karger. Berlin, 1898.

[6] Krönig and others.

[7] Ernst, Dobbin and others.

[8] Krönig: Bacteriologie des weiblichen Genital Kanals. Leipzig, 1897.

[9] Birch-Hirschfeld.

I found the broad ligaments considerably thickened, œdematous, and of a pearly-white color. The peritoneum covering the uterus presented the same appearance. The adnexæ were apparently normal. The ligatures in the broad ligaments were applied as far out and as near the pelvic wall as possible. During the operation a couple of pints of saline solution were introduced subcutaneously. The patient left the operating-table with a pulse fully as good as that before the operation. She ran some temperature for three days following the operation, after that it gradually fell to the normal, and she made a good, though slow recovery. Three months later she was the picture of good health.

The removed uterus presented the following characteristics: Body and fundus moderately soft, lower segment of quite firm consistence, cervical canal tightly closed. Length, 15 centimetres (6 inches); width at fundus, 13 cm. (5½ inches); thickness of wall at fundus, 3 cm. (1⅕ inches). On cutting open the uterus the whole interior above the cervical canal was found to be covered with a dark, tenacious, slimy discharge, emitting a very fetid odor. Attached to the left horn and extending transversely was a portion of placental tissue, measuring 2 x 4 cm. Its free surface was rough and irregular and its attached surface organized and very firmly adherent to the uterine wall. So firm was this union that with the nail and finger it could not be peeled off.

My course of action in the case has been severely criticised. My critics asserted that had I used my finger instead of the curette I would have been able to detect and remove the placental tissue, and thus have avoided the necessity of a hysterectomy. A superficial glance at the bisected uterus might lend color to such a criticism, but a close study of the specimen and of the history of the case would soon convince an unbiased observer that it was both unfair and unwarranted. When I curetted the cervix was so tightly closed that to attempt to dilate it so that a finger could be introduced would undoubtedly lead to rupture of the uterus. Granting even that the finger could have been introduced, it would need to have been of unusual length (over five inches) to reach the site of the placental attachment; then, again, the placental residue was so firmly attached to the uterine wall that I could not peel it off with my finger-nail even after the uterus was cut open. Further, still, assuming even that the placental residue had been removed at the curetting, what warrant is there for the assumption that the patient would have recovered without further surgical intervention? The condition found three days later on opening the abdomen should afford a strong negative reply to this.[1]

The spirit of unfavorable criticism blinded my critics to the true significance of the case and to the valuable lesson it teaches. We have always been told that the presence of placental tissue in the uterus manifests itself by hemorrhage and by fetid discharge. Here was a case in which neither of these signs existed. There were no fetid lochia nor discharge of any kind, and there had been no hemorrhages. It was by a process of exclusion that I had arrived at the opinion that the uterus was the source of the sepsis, but the finding of placental tissue on cutting it open was a great surprise to me, and constituted another object lesson at unlearning.

CASE III. (reported also in the same number of the *New York Medical Journal*).—The patient was thirty-nine years of age and a primipara, in labor for three days, when the services of the New York Lying-in Hospital were obtained. High forceps were applied; very powerful traction was necessary, owing to a contracted pelvis, with a dead child as the result. The patient was said to be septic at the time of the delivery. Her symptoms ran a moderately mild course until the eighteenth day of the puerperium, when she had three severe chills. She now became desperately ill, and was refused admittance into the several hospitals to which the husband had applied. She was admitted into St. Mark's Hospital, January 3, 1898, at 10 A.M. (the twentieth day of the puerperium). I saw her an hour later. Her temperature was 103.5°; pulse 120, small, weak, and irregular; respirations 46; tongue dry and coated, abdomen moderately distended and exquisitely tender everywhere. There was no wound of the perineum or of the vagina; the cervix was deeply torn, but granulating nicely; the uterus was slightly larger than corresponded to the period of involution. Curettage under narcosis removed considerable decidual tissue and débris.

January 4th, 6 P.M. Abdomen much more distended. Temperature 103.6°, pulse 130, intermittent and very weak.

At 8 P.M. abdominal total hysterectomy. The parietal peritoneum was of a dirty grayish color, as was also that covering the intestines. There was some turbid fluid in the free peritoneal cavity. The operation was rather difficult, owing to the very great distention of the intestines. The abdominal cavity was flushed with sterile salt solution and the pelvic cavity loosely packed with iodoform gauze, the ends passing through the vaginal and abdominal wounds. The patient made a rapid and uneventful recovery.

---

[1] Cases are reported in which the placental residue was removed and the patients died. (Brieger's Charité Annalen, 1888, Band xii., and others.)

The uterus at the time of removal was large, soft, and flabby; its cavity was covered with a dark-colored, tenacious discharge. The adnexæ were apparently normal.

This was a case of acute peritonitis from uterine infection, and, as frequently happens, the bacteria invading the peritoneum evidently passed through the uterine wall without producing any noticeable changes in it. I was subjected to criticism for this case also. It was stated that if I had merely flushed the abdominal cavity that the woman would in all probability have recovered without the sacrifice of her sexual organs. Had the circumstances in that individual case been different the comment would have been worthy of consideration; but here we had an old primipara (fortieth year) with a contracted pelvis, necessitating high forceps and such traction that a dead child is obtained. In addition to this, we have a badly torn cervix. What sense would there have been in the attempt to save the uterus in that instance? Under different conditions the essay might be worth considering; but as yet the data bearing on this point are not encouraging. All the cases recorded in the literature in which this procedure was followed have ended fatally.

CASE IV.[1]—A primipara, aged twenty years, had been delivered by her physician with forceps on April 17, 1898. On April 19th her temperature was 102° F., and on the next day it was 104° F. He then used the dull curette without anæsthesia. As the temperature remained the same, he used the dull curette again twenty-four hours later. On April 26th the temperature reached 104° F. A second physician was called in consultation, who made use of the sharp curette and removed what he took to be considerable placental remains. No improvement followed this; on the contrary, the temperature indicated marked sepsis, varying from 101° F. to 105.5° F. in the twenty-four hours.

I saw the patient on May 1st at 8 A.M. (thirteen days after the confinement). She lay in an apathetic condition, with rather a dry and heavily coated tongue; the temperature was 101° F. (mouth), pulse 130, and of fairly good volume. The abdomen was flaccid and not sensitive. On bimanual examination the uterus was found large, flabby, and rather difficult to outline; the cervix was patulous, and the index finger readily passed into the uterine cavity, which was found quite empty. At one point in the fundus the uterine wall seemed very thin. Behind the uterus and toward the right side was an ill-defined, boggy mass, which could not be mapped out separately from the uterus. A peculiar feature noticed in this examination was the lack of sensitiveness in exploring the uterine cavity. The uterus seemed an inert mass. At 6 P.M. the condition became rather alarming. Temperature 106° F., pulse 140 to 150; mucous membrane of lips cyanotic; extremities cold; patient complaining of great weakness.

---

[1] Case and specimen presented at a meeting of the Obstetrical Section of the Academy of Medicine, May 26, 1898.

A transverse incision was now made in the posterior vaginal vault for the purpose of exploring the mass and of giving exit to any collection of pus it might contain. No anæsthesia was employed. The mass proved to be a portion of the flabby uterus, which had sagged down in Douglas' cul-de-sac, and had given rise to the impression of a separate tumor. The incision was packed with iodoform gauze, and various stimulants were applied to the patient. For the next forty-eight hours her condition remained about the same, the temperature varying from 102° to 106° F., pulse 130 to 150, but the heart's action was growing perceptibly weaker and the patient was becoming more apathetic. On May 3d she was transported to St. Mark's Hospital, and at 4 P.M. I performed abdominal hysterectomy. On the solicitation of a former house surgeon, and against my own inclination, I first made an attempt to extirpate the uterus *per vaginam.* The uterine tissues were so friable, however, that every traction instrument simply tore out, and I soon desisted from the attempt; but the patient lost more blood in this step than she did during the remainder of the procedure from above. During it the patient was given fully a quart of physiological saline solution under the skin. She withstood the operation fairly well. On the second day following she developed a septic pneumonia, which gradually spread over both lungs, and until lysis occurred, between the tenth and twelfth days, she virtually lay at death's door. From this on she gradually improved, but the convalescence was slow and tedious, being protracted by a submammary abscess caused by one of the subcutaneous saline infusions.

The removed uterus was soft and flabby, measuring 13 centimetres in length and 11 centimetres in width at the fundus. On the interior of the fundus was an area about the size of a silver dollar, from which all the muscular wall had been scraped away; nothing but the peritoneal covering was left at this point. The external surface of the uterus was studded with small abscesses, varying in size from a pea to an almond; most of these were quite superficial. The peritoneum covering one of these abscesses, which was situated on the anterior wall just below the uterine insertion of the right tube, and which was about the size of an almond, was very much thinned. In a very short time the thin peritoneal covering would have given way and a foudroyant septic peritonitis would have resulted from the escape of the pus into the free peritoneal cavity, in the event of the patient not having previously succumbed to the sepsis. Both tubes and ovaries were quite normal in appearance.

The most carping critic could find no fault with the procedure followed in the above case, nor could anyone gainsay the assertion that the operation saved the patient's life; and still the same principles and the same process of reasoning guided me in this instance as in the other two cases of hysterectomy. The indications based upon the clinical course of the cases were exactly similar. No one could have foretold that the uterus in this instance would be found riddled with small, subperitoneal abscesses. To my mind, the operation in the two other cases was just as much a life-saving procedure as in this case.

It may be of interest to narrate here two cases in which my advice of a hysterectomy was not followed, and in which the operation, in my opinion, would in all probability have saved the patient's lives.

Case V.—A strong German woman, a multipara, had miscarried of twins about the fourth month, the day before I saw her, June 15, 1898. A midwife had been in attendance, who said she did not make a vaginal examination, as she found on her visit the twins and the placenta lying between the patient's thighs.

I found the patient with a moderately distended abdomen; the breathing rapid and shallow; the temperature 103° F.; the pulse 120, rather small and thready. On vaginal examination the cervix was found quite open, and I could feel placental tissue within the uterus. I at once subjected the woman to a thorough curettage under narcosis, using the finger and sharp curette, removing a large quantity of placental tissue.

At 9 a.m. on the next morning the patient seemed to be somewhat improved. She had passed flatus, she said she felt easier, but I was not satisfied with her condition. Her temperature was 104° F. (rectal), pulse varying from 120 to 130, weak and irregular. The abdomen was still considerably distended; altogether the patient did not show the improvement one expects after a thorough emptying of the uterus in sepsis following an abortion. I had made arrangements to have her transported to St. Mark's Hospital, but owing to the absence of ambulance service she was taken to another very prominent hospital in the city. I called there on the next day (June 17th) and made inquiries of the patient's condition from the house surgeon. He informed me that she was doing fairly well, " though she was running some temperature," and that there were no signs of peritonitis, as the patient was having loose bowels. He asked me what I would do in the case. I replied, if the improvement was not marked I would do a hysterectomy, as I had intended. This reply evoked an incredulous smile, and the remark that the attending surgeon thought the patient would get well without an operation.

I learned afterward that the patient died on the 20th (five days after I had last seen her), and that the autopsy was made by the coroner's physician.

All the knowledge I could obtain on polite inquiry from this high and scientific official was a very curt reply that there was septic peritonitis.

I wish to draw attention to the circumstance in this case that, although the sepsis was due to retained placental tissue, which was removed *in toto*, as it was feasible to explore the uterine cavity thoroughly with the finger, the patient died after the lapse of five days from septic peritonitis. This case has a marked bearing upon the comments made on Case II.

Case VI.—On the night of April 23, 1899, I was called to see a young primipara who had been delivered forty-eight hours before with forceps by a careful physician trained in modern methods. He assured me he had taken every possible antiseptic and aseptic precaution. On the next day she had fever and severe abdominal pain, which persisted in spite of treatment. At my visit the temperature was 103° F., pulse varying from 120 to 130, and possessing the character suspicious of a commencing peritonitis. There was a slight tear in the perineum, which the doctor had sutured. The uterus was hard to outline, the abdomen was moderately distended and rather sensitive to pressure. An hour later, under narcosis, I explored the uterine cavity with the finger and curette and found it quite empty. The uterus was soft and flabby, and showed no tendency to contract. The exploration was followed by an intra-uterine irrigation. I removed the sutures in the perineum. The wound, which was not very healthy looking, was cauterized with pure carbolic acid.

I made a very grave prognosis and advised, if there were no marked improvement in the morning, to have the patient sent to the hospital for the purpose of performing a hysterectomy. For various reasons my advice was not followed. The patient died three days later. Her physician kindly furnished me with the following notes: "The patient reacted fairly well from the curettement (?) on Sunday night. Her temperature on the following morning was 103° F., pulse 118, respirations 28. Vomiting set in and continued up to her death. Tympanites and swelling of the abdomen continued to increase, despite the application of ice to the abdomen. Apart from the vomiting and diarrhœa, which set in also on Monday, her general condition was good. Her pulse never rose above 120 except shortly before dissolution, when it became very rapid and was soon lost altogether. On Wednesday she went into collapse, and died on that day. Consciousness remained up to the very last."

I have no doubt that the diarrhœa in the foregoing case misled the medical attendant, who could not understand why the bowels could act freely in the presence of a septic peritonitis. When I saw the case the whole clinical picture impressed me as that of a commencing septic peritonitis, which would probably run a rapidly fatal course, but which might be arrested by an early hysterectomy. The patient had in her favor youth, a robust constitution, and a pulse which still was of a fairly good quality. I am convinced that an early operation could save some of these highly virulent and rapidly fatal forms of septic peritonitis; but surgical intervention, to be successful, must be prompt in this class of cases, just as it must be prompt in gangrenous and perforating forms of appendicitis without limiting adhesions. It is especially in these cases that the setting of the indications for operation is attended with such difficulties, for one hesitates to resort at once to so radical a procedure as a hysterectomy, and yet a delay of some hours may turn the balance against success. It is to be hoped that the experience gained in the study and observation of the fulminant forms of appendicitis will be of aid to us in forming the indications for operation in the fulminant forms of puerperal septic peritonitis.[1]

CASE VII. *Septic endometritis followed by acute salpingo-oöphoritis; salpingo-oöphorectomy; recovery.* (Reported in the *Medical News*, March 25, 1899).—A primipara, aged twenty-three years, had a normal labor on

---

[1] A friend of mine, a colleague, no doubt owes the preservation of his life in an attack of appendicitis, first, to the high diagnostic skill of his medical adviser; and, secondly, to the surgeon sent for, who had the courage to operate six hours after the first onset of symptoms. The operation revealed a gangrenous appendix and a commencing general peritonitis.

October 22, 1898. On the third day of the puerperium she had fever (temperature 103° F., pulse 106). During the next three days the fever gradually subsided, so that on the sixth day the temperature was 99.8° F. and the pulse 96. On the eighth day she had a severe chill, her temperature went up to 104° F., her pulse to 120. I saw her at 9 P.M. The tongue was coated with a white fur, the abdomen was not distended nor sensitive to pressure; there was a moderate tear in the perineum, which was granulating normally. The cervix was fairly patulous, but there was no discharge, and consequently no fetid lochia. The attending physician had given an intra-uterine douche at 3 P.M., but nothing had been washed away. The uterus was large, rather soft, reaching nearly to the umbilicus, and lying toward the right side of the abdomen. A very thorough curettage under full narcosis was performed, and several fragments of tissue were removed from the posterior uterine wall, where the finger could feel several ridge-like elevations. By depressing the fundus with the hand over the abdomen the intra-uterine finger could readily explore the whole cavity, which failed to find anything but the rugosities already referred to. Frequent intra-uterine irrigations were afterward employed and washed away considerable muco-purulent discharge. The patient gradually improved, so that on November 7th (the fifteenth day of the puerperium) her highest temperature was 99.2° F. and pulse 102. On November 8th (the sixteenth day), without any appreciable reason, the temperature and pulse began to go up again, and the patient complained of severe pain in the right iliac region. Now, for the first time, one could feel an elongated mass, about the thickness of the thumb, beneath the very thin abdominal wall. It seemed fixed and was exquisitely tender. At 4 P.M. the temperature had risen to 104° F. and the pulse to 140. It seemed evident that the infection had passed into the right tube and set up an acute salpingitis. I decided, therefore, to open the abdomen without further delay and to be guided in my future action by the condition found. This was accordingly done an hour later. The uterus was about the normal size, of firm consistence, and presented no lesion upon its exterior. To the right of the uterus lay an ugly-looking mass, almost black in color, which on closer inspection proved to be the right tube and ovary matted together. The ovary was double the normal size, of a dark reddish color, œdematous, and covered with black, angry-looking exudates. The tube presented the same dark appearance, was the thickness of one's thumb, with the fimbriæ very much thickened and looking like a black mushroom. The infundibulo-pelvic ligament was considerably infiltrated and reddish in color. I tied off the ovarian vessels as close to the pelvic wall as possible, then rapidly excised the tube and ovary with the scissors, following the excision right into the horn of the uterus. The resulting wound was quickly closed with a looped continuous catgut suture. An opening was made through Douglas' cul-de-sac into the vagina, through which a strip of iodoform gauze was carried. Another strip of gauze was laid over the line of suture in the broad ligament and the end made to pass out at about the lower two-thirds of the abdominal incision. The abdominal wound above and below this point was closed in the usual way with tier sutures. The patient made a good recovery, with primary union of the abdominal wound, although for some time there was a free discharge of purulent matter from the vaginal and abdominal openings. At no time was there any evidence of peritoneal irritation, the flatus being freely passed eighteen hours after the operation. Three months later the patient was in an excellent condition. Such of the pelvic organs as were not removed appeared healthy; the uterus was of normal size and in good position; there was no pelvic exudate, and the menses were regular.

The above case, to my mind, strikingly illustrates the value of prompt surgical intervention in properly selected cases. It was evident that the infective process had passed beyond the uterine cavity and was setting up an acute lesion in the right appendage. The severity of the symptoms attending the onset of this extension resembled that observed in a bad case of appendicitis, and on opening the abdomen the tube and ovary presented that same dark and angry appearance seen in an appendix that has become gangrenous.[1]

In these cases and in those in which hysterectomy is done for acute septic metritis I think it is a good plan to drain from above and below.

No matter how far out one applies his ligatures on the broad ligament, considerable of the infiltrated ligament is left behind. These in all likelihood will break down and suppurate. If no provision has been made for the exit of this broken-down material the patient will succumb to secondary sepsis.

My first case was almost lost because the drainage was interfered with during the first days following the operation. After free drainage had been established the temperature gradually fell to the normal.

I am aware that these views are in opposition to modern teaching regarding drainage; but these cases of acute puerperal sepsis form, in my opinion, a law unto themselves. Besides, I am inclined to think that the pendulum in the question of drainage at the present time has swung a little too far in the opposite direction.

There is another point regarding technique upon which I would like to touch—*i. e.*, the route. According to my experience, the abdominal route is to be preferred. In the one instance in which I was induced to adopt the vaginal one I had to abandon it, owing to the great friability of the uterine tissues. In this attempt the patient lost more blood than she did during the remainder of the operation, which was carried out from above. I find that even patients who are profoundly septicized and who go to the table, say with a temperature of 105° F. or over and with a pulse of 160, will withstand a hysterectomy fairly well, providing that there has not been much loss of blood; and it seems to me that hæmostasis can be better attended to when operating through a good-sized abdominal incision than when operating through the vagina.

---

[1] The case bears considerable resemblance to one reported by A. De Pourtales (Archiv für Gynäkologie, Band lviii., Heft 1) from Bumm's clinic (the home of bacteriology in puerperal sepsis). In Pourtales' case, on the twenty-second day of the puerperium, after several periods of apparent quiescence, the infection evidently extended from the uterus to the right broad ligament. Instead of opening the abdomen, as was done in my case, the uterus was subjected to permanent irrigations and the patient to cold packs, cold douches, etc., with the result that death occurred six days later—*i. e.*, on the twenty-eighth day of the puerperium. The autopsy revealed purulent peritonitis and suppurative thrombosis of the pelvic veins, secondary to suppuration of the thrombi at the placental site. On the fourteenth day of the puerperium the patient was curetted, and the uterine discharge was examined bacteriologically. No streptococci were found. On the twenty-second day the uterine discharge was again examined, and this time streptococci were detected. Could a better illustration be offered of the unreliability of bacteriological examination even in the most expert hands?

Lastly, we come to a class of cases in which, as a result of puerperal infection, a fairly large collection of pus forms in the pelvic and lower abdominal cavities. Every one is agreed that here the surgical principle of giving exit to pus, whenever and wherever it exists, should be adhered to, and yet it is just in these cases that a cautious and conservative course finds its justification. Of course, if the collection is so situated that it can readily be evacuated by an incision in the vagina or by one above either of Poupart's ligaments, so that the peritoneal cavity is not entered, no time should be lost in carrying it out; but it not infrequently happens that the collection is so placed that it cannot be reached by either of these incisions. We are then forced to sit on the horns of a dilemma—on the one hand, we are in danger of losing our patient through hectic exhaustion or through general pyæmia; on the other hand, we may kill our patient in the attempt to get rid of the pus by setting up a rapidly fatal peritonitis—for it cannot be too forcibly borne in mind that the pus in acute puerperal sepsis is highly virulent and that the slightest soiling of the peritoneum with it is almost certain to be followed by disastrous results.

It is my custom in these cases to keep them under close observation and to wait cautiously for an opportune moment to intervene. Fortunately, the very circumstance that a pelvic abscess has formed argues that the process is localized and that judicious delay is not attended with any great danger.

In some cases, if the collection is in the upper part of the broad ligament, and it is doubtful if it can be reached by an incision above Poupart's ligament, I make an incision in the median line at a point above the upper limits of the mass. I then carefully inspect the relations of the mass with the abdominal wall and observe if any coil of intestine intervene between the two. If there be no coil of intestine in the way and the mass is adherent directly to the abdominal wall, as frequently happens, the median incision is closed; an incision is then made directly over the mass and the pus evacuated without entering the general peritoneal cavity. When feasible, a counter opening is made in the vagina and through-and-through drainage established.

When following this method the greatest care must be observed not to break down the adhesion which shuts off the pus collection from the abdominal cavity. In my first case I manipulated a great deal with my fingers to ascertain the exact relationship of the mass, and, before I was aware of it, some pus appeared; and although the intestines were apparently well protected with gauze compresses, the patient promptly died in forty-eight hours from septic peritonitis. Since then I have been more cautious and have not had a repetition of the accident.

The two following cases, occurring recently in my practice, will illustrate my meaning:

Case VIII.—Mrs. S. had been delivered of a child six weeks before I saw her. She had not made a good recovery from her confinement, felt weak, had some pain in the abdomen, and had a small, rapid pulse. The temperature for most of the time was about normal (she had not been kept under close observation). On examination the uterus was slightly enlarged, and extending from the right horn was a hard mass, with which it seemed intimately connected. The mass was not very sensitive; it was moderately fixed, moving slightly with the uterus. The right tube and ovary could be palpated independently of the mass.

I made the diagnosis of an exudate in the upper part of the broad ligament, and advised delay and palliative measures. Four weeks later I was called to see the patient again. Her general condition remained about the same. She was up and about the greater part of the time. The mass had grown somewhat larger, was now adherent to the abdominal wall, even bulging it outward. The patient was admitted into St. Mark's Hospital, where I made a good-sized incision over the mass, about two inches above Poupart's ligament. After cutting through the abdominal wall about six ounces of pus were given exit. A counter opening was made in the right lateral fornix of the vagina. In about four weeks the patient was able to leave the hospital, and two weeks later the fistulous track had closed. Her general health had by this time improved very materially. When seen by me two months later she had fully regained her health; the pelvis was free from exudate, the menses were regular, and she did not have a symptom referable to the pelvic organs.

Case IX. was seen by me February 27, 1899. She had been delivered with forceps on January 26th. Had considerable post-partum hemorrhage. Placenta came away entire. On the fifth day of the puerperium the temperature was 104° F., pulse varying from 110 to 130. Considerable pain in the left groin. For the next two weeks the temperature ranged from 100° to 104° F., pulse from 110 to 120; then the temperature fell to the normal. She got up out of bed on the fourteenth day and remained up for a week. During this time the pain in the left groin had grown worse and more constant. At the end of the week she sent for her physician, who found her with a temperature of 104° F., and he put her back to bed.

At the time of my visit she had a temperature of 102.4° F. and a pulse of 120. Her general condition was fairly good. The abdomen was somewhat distended, especially below the umbilicus. It was very rigid and rather sensitive to pressure.

On bimanual examination there was an ill-defined mass on the left side, the upper boundaries of which were difficult to determine on account of the abdominal rigidity. There was considerable resistance in the right iliac fossa. The uterus could not be outlined independently of these pelvic masses. At no point could any fluctuation be detected.

I advised palliative measures and opium suppositories to relieve the pain. The patient was to be carefully watched, and as soon as any fluctuation was evident a good-sized vaginal incision was to be made and drainage employed. The attending physician called on me five days later and informed me that the patient had passed a small amount of pus per rectum three days ago; that the discharge had ceased yesterday; that the temperature was 99° F., and that the general condition of the patient was good.

On March 12th (a week later) he asked me to see the patient again, as she had not been doing so well for the past few days. I was surprised to find that now the whole lower part of the abdomen was occupied by a hard mass, which reached midway to the umbilicus. Fluctuation was not evident, either through the vagina or abdominal wall. The patient was at once transported to St. Mark's Hospital, where, on the following morning, I operated upon her. I first made a large incision in the posterior vault of the vagina, then passed my fingers through the incision, but could not reach any abscess-cavity. I next made several punctures with an aspirating needle into the mass through the vaginal incision, but no pus was obtained. The vaginal incision was now packed with iodoform gauze and an oblique incision was made about two inches above the right Poupart ligament, and the mass was reached after cutting through the abdominal wall. It was covered with peritoneum, but appeared to be shut off by adhesion from the upper peritoneal cavity. After making several punctures in various directions with an aspirating needle some pus was encountered. An incision at this point was now made, with the needle as a guide, and a cavity opened, containing about four ounces of pus. With the finger in this cavity an effort was made to reach some other purulent foci, which I felt confident existed, but without success. I then made an incision over the mass in the median line, and, although I cut cautiously, I found I had entered the bladder, which lay stretched over the mass for fully three inches above the symphysis. The bladder was at once sutured, and, adopting the same measures as before, another abscess-cavity was found at the upper third of the mass. The finger was made to enter this, with the view of breaking into some other pus-cavities, but it did not encounter anything but hard and unyielding tissue. A third incision was made in the left side, and a third abscess-cavity, containing about six ounces of pus, was opened. By using considerable force with the fingers I was enabled to connect the abscess-cavity in the median line with that on the left side, but I could not break through the exudate downward so as to reach the vaginal incision and obtain through-and-through drainage. As may be readily conceived, with a subject who had been septic for over six weeks, the pulse had by this time become very feeble, and I desisted from any further attempts to obtain drainage through the vagina. The patient made a slow recovery; the opening in the bladder began to leak about a week after the operation, but with the aid of a permanent catheter in the bladder the fistula closed in about three weeks. The patient left the hospital on April 30th, with all the wounds healed excepting a small, deep, fistulous track[1] on the left side. From being a mere skeleton, with a large, sacral decubitus, when she entered the hospital, she left it with a good color and having gained fifteen pounds in weight.

---

[1] Since the above was written the fistula has closed, the patient is perfectly well, and menstruates regularly, November 1, 1899.

It seems to me that in the foregoing case any other course than the one carried out would have been attended with dire results. It would have been unwise, even were it feasible, to have attempted anything more radical than what was done. There was absolutely no possibility of determining the position of any of the pelvic organs. The whole lower third of the abdomen was as completely filled with the mass as if molten lava had been poured into it and allowed to harden. Not to have intervened surgically would have meant prolonged suffering, with doubtless a fatal termination. Every one will recall having seen such neglected cases and the ghastly spectacle they presented—mere skeletons covered with bed-sores, riddled with purulent sinus tracts. Surgery cannot do anything for these unfortunate cases at that stage, and death is looked upon as a kind savior.

The points I have endeavored to make in this paper are:

1. Puerperal sepsis is wound fever or wound infection, and wound infection in the female genital canal, as elsewhere, calls for surgical measures, such as free drainage, irrigation, and the removal with a sharp instrument of any débris or exudate that may form on the surface of the wound. These means failing to accomplish the desired result, ablation of the diseased organ or organs as a *dernier ressort* is indicated.

2. In a given case of puerperal sepsis a thorough search is to be made of the whole of the genital canal in order to determine the site of the original infection.

3. If this is situated in the uterus, curettage, drainage, and irrigations are to be employed. In 95 per cent. of the cases of puerperal sepsis nowadays met with this plan of procedure will be all that is necessary to bring about a cure.

4. In the remaining 5 per cent., roughly speaking, these measures will not be efficacious to arrest the progress of the infection, as will be evidenced by the pulse, temperature, general course of the disease, and sometimes by local signs. An exploratory laparotomy is then indicated, the further course to be guided by the pathological lesions found. In most of these cases total hysterectomy will be required.

5. When large collections of pus form and are so situated that they can be readily reached either with a vaginal incision or with one above either of Poupart's ligaments, no time should be lost in resorting to surgical relief. When, however, they are not so favorably situated, judicious delay is advisable, with the hope that ultimately the pus may be evacuated without the risk of soiling the general peritoneum.

Such a course not only averts the risks to which the patient would be exposed by a more radical procedure, but affords her an opportunity of being restored to health with the conservation of her sexual organs.

A CASE OF "FAMILY PERIODIC PARALYSIS."

By James J. Putnam, M.D.,
PROFESSOR OF DISEASES OF THE NERVOUS SYSTEM, HARVARD MEDICAL SCHOOL, BOSTON.

It will be remembered by those who have followed with any care the recent neurological literature, that a year and a half ago Dr. E. W. Taylor[1] published the remarkable history of eleven cases of the curious disease indicated in the title of this paper, all occurring in one family, in the course of five generations, and gave an admirable summary of all the cases, relatively few in number, which had hitherto been recorded.

A year later Dr. J. K. Mitchell[2] reported the case of another patient, also one of several occurring in the same family, whom he had had the opportunity to watch for a long period in his hospital wards, and had studied with painstaking thoroughness from various points of view.

In brief outline these cases are characterized mainly by a tendency on the part of the patient, generally a young or middle-aged and previously healthy person, to become rapidly paralyzed, usually in the night, so that for the space of the seizure, one or two days in length, he is incapable of voluntary motion, except as far as the face, eyes, and respiratory muscles are concerned, and not only this, but the electrical and the reflex excitability of the affected muscles is diminished or lost, so that powerful faradic or galvanic currents—even when, as in Dr. Mitchell's case—applied with needles thrust into the substance of the muscles, are powerless, at the height of the attack, to excite any response. The reflex and automatic movements necessary for organic and vegetative life are rarely much involved, but even these are not always wholly free, and the heart sometimes becomes temporarily enlarged. The sensibility is rarely if ever affected. Many members of a single family, in the same and successive generations, are apt to be affected.

Most of the cases reported from either side of the ocean have been closely alike, but whereas it has hitherto been the striking resemblances which have attracted most attention, before a final opinion as to the nature of the disease is reached, the discrepancies between the different instances, which are by no means insignificant, will also have to be fully taken into account.

The patient whose case I have to report[3] is a young man, aged twenty-four years, of good health and of rather unusual muscular development, so much so that at one of my visits he showed me a series of dumb-bells running up to ninety pounds with which he was accustomed to exercise. This great strength is noteworthy, because it is possible that it is a stigma of morbid tendency rather than a sign of balanced health.

---

[1] Journal of Nervous and Mental Disease, November, 1898.

[2] The American Journal of the Medical Sciences, November, 1899.

[3] I am indebted to Dr. Sidney A. Lord for the notes of an additional examination which he made on November 26, 1899.

He was said to be of a rather nervous temperament, but showed no marked signs of this at either of my three visits. The father, mother, two brothers and a sister are living and well, and present no peculiarities of note, except that the sister has leucodermatous patches on various parts of the body. No other case of periodic palsy has occurred in the family, but it is needless to remark that there must have been at one period an isolated first case of the groups already reported.

The first attack in my patient's case occurred when he was fourteen years old, and since then severe seizures have recurred at intervals varying from one to seven months, with lighter attacks interspersed between them. The frequency of the severer attacks has been growing less as years have gone on.

As a rule, the attacks have occurred on Sunday or Monday, and it is noteworthy that the same tendency toward recurrence on a certain day of the week was observed in Dr. Mitchell's case, and in one of Goldflam's.[1] It will be remembered that the same sort of thing is often spoken of by patients with migraine. Possibly half-conscious expectation has something to do with the fact, and possibly, too, the patient falls into the habit of noting more carefully the attacks which seem to favor this singular preference for a special day. On the other hand, it is conceivable that the special occupations of the day preceding that on which the attack usually falls may be found to have a predisposing influence, or, again, that the tendency is an affair of cyclic recurrence.

The seizures repeat themselves with great constancy, and are of about the following sort: The onset is generally rapid, the patient going to bed in his usual health and waking in the morning unable to move hand or foot, though premonitory signs sometimes present themselves a day or two before, in the form of a slight tendency to toe-drop. His mother says, also, that he is apt to be irritable and excitable a day or so before the attack comes on.

In the severer seizures the paralysis is so complete that the patient can move few muscles except those of the lips and eyes. If the head slips off the pillow, or the arm off the bed, it must remain until someone comes to replace it.

The sensibility is said to be perfect, both that of contact, temperature, pain, and that of the position of the limbs. When the paralysis is not complete the limb feels excessively heavy on attempts at movement.

---

[1] See Taylor, loc. cit.

The attacks vary in length from a few hours to two or three days, and after they are substantially over several days or a week may elapse before his muscles regain full power. A slight attack can sometimes be worked off if the patient insists on getting up and exerts the effort necessary to haul and shove himself about for a time. A temporary improvement brought by strenuous efforts of this sort is, however, followed by a specially severe seizure, and this, too, has been noted for other cases (Taylor). His mother says that he looks pale and yellow during an attack, and he is apt to feel very sleepy and tired during the first few hours. He usually takes but little food or drink, because he has found that larger quantities make him worse. On being questioned as to the amount of urine passed during the days of illness, he said at first that it was very small, but afterward was inclined to think that the peculiarity lay not so much in the diminution of quantity as in the fact that the need of micturition was reduced, so that he emptied the bladder perhaps only once in twenty-four hours. He would often vomit during an attack, especially if food were taken.

As regards the order in which the different movements are affected, it appears that the dorsal flexion of the foot is always the first to go, and the patient makes the statement—important, if true—that he used to notice a weakness of the muscles required for this same movement after exercising for some time on high jumping in the gymnasium, even before his fourteenth year, when the illness ostensibly began. His next difficulty is usually that of rising from a chair and extending the leg at the knee. At this stage of the attack he can sometimes walk about by using great care to keep his knees stiff, but cannot get up if accidentally thrown down. There is no palpitation, but there is a sense of oppression, associated with difficulty in taking a long breath. There is no sweating or itching, such as has been reported of some of the other cases. He says that his hands are apt to look bigger and redder during the attack, but his mother thinks that they are usually cold.

As regards predisposing causes, the only one which has impressed him as at all important is taking too much food. Thus he has thought that late suppers sometimes provoked an attack on the following day, and has explained the tendency for the attacks to occur on Monday by his habit of staying at home on Sunday and eating more generously than usual. He formerly thought that excessive physical exercise provoked seizures, but has rather given up that theory, in view of the fact that he took a bicycle trip not long ago, of two months' duration, during which he rode upward of eighty miles a day without being troubled with any signs of illness either at the time or later.

The paralysis usually comes on during the night and passes off during the night, at least for the most part.

The patient was never regularly under my care for any length of time, and the only outbreak in which I had the opportunity of making a personal exmination was one which occurred on August 23, 1899, when I was called as the seizure was passing away. I then found him sitting in an easy chair, with his hands resting on his knees and his feet on a stool. He was at that time able to move the head freely and to open and close the jaws. The motions of the fingers and hands were fairly free. The toes could be moved and the feet also, though but feebly. Extension and flexion of the arm at the elbow and of the leg at the knee were possible, though performed with great difficulty, but there was no motion at the shoulder or hip. In fine, the movements at the root of each limb were much more seriously impaired than those at the extremity, the reverse of what is seen in toxic multiple neuritis. The electrical irritability of the various muscles and nerves corresponded almost exactly to the degree of paralysis. Thus I was unable to obtain any reaction with the strongest currents produced by a Barrett chloride of silver faradic battery, in the deltoid, biceps, or quadriceps extensor cruris. On the other hand, the interosseous muscles gave prompt response to strong currents, with the stimulus applied either at the motor points or on the course of the ulnar nerve. Stimulation of the peroneal nerve caused feeble contraction in all the muscles supplied by it. The knee-jerks were absent, and likewise the abdominal and plantar reflexes, though the tickling of the foot was felt to an unpleasant degree. The area of cardiac dulness was not noted.

An examination made in the interval between seizures showed everywhere normal electrical reactions. The muscles were found to be exceedingly firm and massive. The knee-jerk, though present, was rather slight, less than usually seen in health. An examination of the blood failed to show the lymphocytosis observed by Taylor.

The writers who have hitherto studied this singular malady have been inclined, as a rule, to seek for some special poison, probably of autochthonous origin, but acting perhaps somewhat like curare, as the cause of the symptoms. The idea is a natural one, and the superficial likeness between the condition of these helpless patients and that of a curarized animal is striking and suggestive.

As yet, however, even such searching investigations as those of Mitchell have failed to discover any especially toxic substance in the urine, and the question arises whether some new mode of approaching the problem cannot be found which may make the disease appear less strange, even if it is does not enable us to trace it to its origin. Such is, I think, the case, and I have been led to regard with increasing interest a view suggested to me, at the time of the reading of Dr. Mitchell's paper, by Dr. S. J. Meltzer, of New York—namely, that the symptoms are probably due to the morbid overaction of an influence which, though hitherto but little recognized, probably plays an important part in all the operations of our lives, and which has been designated as "inhibition." Such study as I have been able to make of the matter, especially as presented in Dr. Meltzer's valuable review of the physiological aspects of inhibition (published in the *New York Medical Journal* for May 13 and 27, 1899) and in the recent monograph of the Italian physiologist, Oddi (*L'Inibizione dal punto di vista fisio-pathologico*, etc., Turin, 1898), have persuaded me that the idea is a fruitful one.

Before speaking of this theory in more detail, I wish to say that the safest way to begin the study of a new disease like this is surely to trace the clinical resemblances, even if only of the broadest sort, which exist between it and other disorders with which we are more familiar, and, in doing this, to recognize, just so far as the facts warrant, the bonds that may be found to link all the affections concerned to states of health, in the relationship of outgrowths and caricatures. Looking at the matter in this way it might be said that although, as Goldflam points out, this disease presents a closer analogy to the myotonias than to any other single affection with which we are familiar, yet, in the duration of the interval between the attacks, the length of the single seizures, their tendency to come and go in the night, their preference, in some cases, for certain days of the week, periodic palsy also recalls migraine; and were it not that some of the special features of the palsy appear so strange as to defy classification, the two affections might be ranged together in the category of the periodical neuroses, of which migraine is a prominent example.

But are these features really so incomprehensible? Taken in just the form in which they here show themselves they are certainly unique, but they are not, nevertheless, without their analogues. The three main characteristics are the palsy, the loss of reflexes, and the loss of electrical irritability. These phenomena appear and disappear in the same ratio, and it may turn out to be the case, as Dr. Mitchell's experiments with the needle-electrodes foreshadow, that the basis of this state of affairs is a loss of excitability of the muscles themselves, and not alone, or perhaps not at all, of the nerves. In this respect, indeed, these cases stand by themselves. On the other hand, functional palsies of one or another sort, more familiar than this, and perhaps of similar or analogous origin, are common enough. Not to speak of the effects of certain poisons, such as curare and conium, or the idea-paralyses of hysteria, we have, for example, the palsies due to the inhibition of shock, those which accompany severe neuralgias, such as migraine and supra-orbital neuralgia,[1] and those which occur as paralytic equivalents for the convulsion in epilepsy. The "night-palsies," the exact etiology of which is uncertain, should also be particularly borne in mind.

---

[1] I have recently seen a paresis of the third nerve, of this sort, which lasted for a week and then gradually disappeared with the subsidence of the attacks of pain.

It has been common to offer "exhaustion" of cortical centres as an explanation of this epileptic paralysis, but the explanation was never a satisfactory one, and it has sometimes seemed necessary to invoke for the sake of it an antecedent seizure of momentary duration, of which there was often no evidence whatever.

It may appear that all these forms of functional palsy, including that which is especially under consideration in this paper, are due, in some measure at least, to the action of inhibition, and it should be remembered in this connection that, on other grounds, epilepsy has recently been regarded by Oddi[1] and others as a disease of impaired relations of inhibition between co-ordinated cerebral centres.

The case of the spinal reflexes is like that of voluntary movement, and they, too, as is well known, may disappear temporarily under the inhibitory influence of shock and agencies of kindred sort. Can the same statement be made with regard to electrical reactions?

The assumption that electrical irritability is a constant function of a healthy nerve and muscle, and one which cannot be made to disappear except as the result of a destructive lesion, has come to be accepted with almost axiomatic force in the physician's mind, and though it has long been a matter of knowledge that this irritability might disappear for a time under the influence of certain paralyzing poisons, and as a result of an electrotonus, and also that there is a time in the regeneration of nerve fibres (according to the assumption of Erb, when the myeline sheath is imperfectly formed) when this local irritability to electricity is still in abeyance, though their power of conduction has been regained, yet these facts have not led to any generalization such as make the loss of electrical reaction in "periodic palsy" easier of explanation. If, however, it can be shown that the phenomena just cited are only a portion of a larger number, and that the loss of electrical reaction, like the loss of a reflex or of the power of voluntary motion, is something that a nerve or a muscle may be temporarily deprived of under various conditions and yet continue to live, the ground will have been cleared for a fairer study of our problem. Still another step will have been made if it can be made probable that some of these phenomena were classifiable as instances of inhibition. A great difficulty in the way of accepting the latter view has been and still is the extreme vagueness of the conception for which that term stands. Great numbers of apparently heterogeneous phenomena have been classed as inhibitory. There is apparently a wide difference between the existence of the delicate adjustments through which the contraction and relaxation of antagonistic muscles are made to play into each other's hands, so as to subserve the purposes of co-ordinated activity and the varied phenomena of quasi-pathological "arrest," such as come to mind more especially in the present connection. But this present necessity of vagueness must not prevent us from accumulating data which may be of future service. It is certainly an important fact that when tetanic contraction has been excited by electrical stimulation of an anterior nerve root the application of suitable excitations to the spinal cord will bring on a diminished amplitude or even a complete cessation of the muscular contraction, which only slowly and imperfectly regains its former strength after the inhibitory stimulation has been withdrawn.[1] Similarly, a contraction due to electrical[2] excitation of the nerve in an isolated nerve muscle preparation may be inhibited for a brief time by the application of a solution of cocaine or of common salt either above or below the point at which the electrodes are applied, while mechanical irritation or chemical irritation of other sorts are either ineffective or reinforce the action of the electrical stimulus. It is true that the inhibition of the electrical stimulation in these cases is of relatively brief duration, but there is no inherent reason why this period might not be prolonged.

---

[1] Oddi, loc. cit., p. 48 et seq.

It becomes clear through these experiments that the obligation on the part of a healthy muscle to contract when its nerve is stimulated by electricity is by no means as cogent as most of us have supposed, and we should be prepared to scrutinize with new interest the perhaps kindred phenomena of loss of reaction due to an electrotonus and curare action, which have been so long a puzzle.

This would not be the place for a long discussion as to what is meant by inhibition, and how far the phenomena ranged by different observers under that heading really belong together; but it may be asserted that most if not all of the functions of the body are poised between two influences, each representing a fundamental property of the nervous system, one of which it is customary to speak of as an impelling and the other as a restraining influence, though such terms as these do not seem appropriate for every case. Under most circumstances these two forces work together, and we see only the single resultant, which usually takes the form either of motion or of what seems to be rest, but is actually, in the case of the muscle, a condition of tonic contraction, which is really a form of motion.[3] It is not difficult, however, to find cases in which the action of the inhibitory force is seen in an isolated form. A few of these conditions have already been alluded to. Another of special interest is that which relates to the vascular mechanism of the submaxillary gland. These vessels are supplied by two sets of nerves, cerebro-spinal and sympathetic respectively, one of which conveys in general the tendency to contraction and the other to dilatation. When both nerves are stimulated together the vessels primarily contract, but when the stimulation is withdrawn the vasocontractors cease their action, while the vasodilators, on the other hand, continue to exert their force, and, for a time, the dilatation is seen as an isolated and active process.[1] The researches of Sherrington and others seem to make certain what has hitherto been doubted (Waller), that the action of the voluntary muscular system comes also under the influence of these two antagonistic forces in such a way that the relaxation of antagonistic groups of muscles is as much an active process as the contraction of those which seem to control the motion of the limb. Indeed, as Meltzer points out, Charles Bell demonstrated as long ago as in 1826 that relaxation instead of contraction could be made by a properly devised experiment to follow an electrical stimulus.

---

[1] Oddi: Loc. cit., p. 48 et seq.

[2] Oddi, also Mosso, Rotondo: cited by Oddi, loc. cit., p. 35 et seq.

[3] "The Recent Study of Muscle-tonus," by Musgens (Neurologisches Centralblatt, 1899, xii.), is interesting in this connection.

But if it is true that a stimulus, whether electrical or voluntary, may cause a muscle positively to relax instead of contracting, and true, also, as in the case of the bloodvessels of the submaxillary gland, that when the force which tends to make a muscle relax and that which tends to make it contract are set in motion together they preserve, nevertheless, their individuality, no great stretch of the imagination is needed for the conception that under certain conditions of disease the divorce between these two forces might be rendered more complete, and relaxation even with loss of electrical irritability, as in the cases of periodic palsy, be made to dominate the scene. Perhaps if we knew how to look for them the clinical history of various other neuroses would be found to present phenomena more or less equivalent to this loss of electrical reactions and arrest of spinal reflexes, and due, like them, to the action of inhibition.

We do not have an opportunity to test the reactions of the bloodvessels in migraine—which are sometimes paralyzed, sometimes spasmodically contracted—or of the cortical areas that seem at the same time to be thrown so strangely out of gear; but no one would be surprised to find that during a migraine attack the normal responses of these organs could not be obtained, just as in Graves' disease[2] it is hard to reduce the rapid pulse by digitalis.

It is, of course, true that even if the phenomena of periodic palsy could be referred to the influence of inhibition the question would still remain open whether we ought not to seek for some "poison" as a final cause of the broken equilibrium between inhibition and its opponent influence—call the latter dynamogenesis or what one will.

---

[1] The reader is referred to Meltzer's paper for a large number of other facts bearing directly or indirectly on the case in hand.

[2] See Meltzer, loc. cit.

There can be no doubt that we should have to go back of the influence of inhibition for a "final cause," but it seems to me more rational to seek this in the tissues than in the fluids of the body, perhaps better still in the correlations between different parts of the nervous system, or between the tissues and the fluids that nourish them. I cannot but think that in the long and hitherto so barren hunt after "poisons," which should account for the various neuroses in their varied and typically recurring forms, the conceptions which have been followed have been to a considerable extent crude, unreasonable, and misleading. Why should we expect, just because a person's nervous system is so constructed in respect to its relations with the nutritive fluid which bathes it as to be thrown periodically into what we call "morbid" activity, that the blood and urine should contain substances incompatible with the life of cats and mice—the test for the presence of poisons which has oftenest been applied? Is not this to show too little respect for the subtlety of these processes and for their relation to states of health?

Perhaps, indeed, all activity and all specialization of functions in health may be expressible in chemical terms, and in that sense the conclusion may be inevitable that morbid activity is similarly expressible, but it is by no means evident that the use of the term "poison" is more justifiable for the second case than for the first. As I have elsewhere indicated, in discussing the nature of infantilism and cretinism, it is often more fruitful to consider some of the abnormalities which we call disease as representing rather modified states of health, and striking as the clinical features of the diseased state may be, it is quite possible that the fundamental differences—the chemical differences, for example—between such a state and that which we call health is extremely trifling. A person with a liability to migraine need not be materially different, chemically speaking, from a person with a liability to a recurrence of hunger at meal-times, or of drowsiness at bedtime—that is, from a normal person.

In the ordinary condition of healthy muscles when at rest (so-called), as Dr. Meltzer has justly pointed out, the resultant of these two opposing forces of relaxation and contraction is shifted somewhat to the motion side, and therefore the tonus of the muscles. Yet one may easily conceive that under slight modifications of nutrition or growth of the nervous system its reaction even toward normal fluids should be so altered that the resultant of the two forces should be shifted periodically toward the side of relaxation.

If these views are just the proper way to study these cases of periodic palsy would be less through the methods of physiological chemistry than through those of physiology. It may prove, to quote Dr. Meltzer again, that these patients are peculiarly susceptible to inhibitions of one or another sort, even in their intermediate states. On the other hand, the phenomena which this curious disease presents can, I believe, also be studied profitably, with a view to broad resemblances between it and one or another of the so-called "neuroses," and with the idea constantly in mind that the neuroses are probably but caricatures and outgrowths of states of health.

This would not be the place to attempt the reproduction of the arguments as to the final nature and definition of "inhibition." So far as they are capable of summary this is clearly and finely given in the concluding pages of Oddi's monograph, of which I can cite here only a part of the concluding paragraphs:

"The view," he says, "that we find ourselves absolutely forced to reject . . . is that which assumes the existence of centres and nerves endowed with the sole function of inhibition. . . . Inhibition, on the one hand—as dynamogenesis on the other—is a fundamental function of the nervous system, one of the two opposing forces between which the great game of life is played; the manifestation of one sort of protoplasmic irritability, of one species of excitability on the part of the nervous system. Its true nature will be known only after we have gained an exact knowledge as to the real essence of nervous force."

Perhaps it would be possible to assume that with every wave of impulse which is set in motion within the nervous system a wave of arrest is likewise started, as a swinging pendulum swings back again, though the effect of the wave of arrest may not become apparent. It is also obvious that we have no right to exclude the impulses which we call inhibitory from being themselves, under certain conditions, the subjects of inhibition.

Another question remains to be considered—namely, whether the occurrence of the rare or anomalous cases and symptoms, of which a sketch is given in Dr. Taylor's paper, makes necessary a modification of views as to the nature and etiology of the disease? The presence of slight, persistent alterations of nutrition of the muscles, in the direction of atrophy (Oppenheim) or of hypertrophy (Bernhardt[1]), or as causing permanent changes in electrical reaction (Oppenheim, Goldflam), might seem to show conditions which could not be classed as "functional," but to this might perhaps be rejoined that the division between "functional" and "organic" is one which can only be arbitrarily drawn. Not only does "hysteria" lead to "organic" disease, but it must also be said that at every moment we pay for life with life.

---

[1] Taylor doubts the admissibility of Bernhardt's cases, but they represent at least an analogous affection.

The curious points of likeness, such as they are, between periodic palsy and myotonia, and the fact that Rich's[1] cases, in which a tonic condition of the muscles was observed (electrical changes not noted), seem to stand as a connecting link between the two affections, tend to substantiate, it seems to me, the view that we have to do with a subtle disorder of the physiological co-ordinations of health rather than with a general poison. The same might also be said of the tendency to muscular hypertrophy in Bernhardt's case, which recalls again the very massive and powerful muscular development in Taylor's case and mine. The functional weakness of the heart, bladder, and intestine might be due, as was suggested in a private letter by Dr. Meltzer, to a general increase of the inhibition function of the spinal cord; and that this should be of periodical occurrence is really no more remarkable than that the same is true of menstruation in health, and, in sickness, of epilepsy and migraine.

THE INCREASING PREVALENCE OF CANCER AS SHOWN IN THE MORTALITY STATISTICS OF AMERICAN CITIES.

By G. Betton Massey, M.D.,
of Philadelphia.

After many years' inattention to the subject, the medical profession has recently awakened to the fact that mortality statistics show a rapid increase in the prevalence of cancerous affections during the past thirty or forty years. According to several writers, this increase has not occurred in the less civilized countries of the world, though it is evident that exact information on this question is necessarily lacking, and particularly so when we remember that the collection of vital statistics is a governmental duty that is liable to be discharged by civilized countries in a manner closely in unison with their position in the scale of civilization, and that those collected by many countries ranking high in the scale leave much to be desired in accuracy and fulness.

It is, nevertheless, the opinion of competent observers that cancerous affections are not common among barbarous peoples. Herbert Snow, of the Brompton Cancer Hospital, in London, states in a recent work[2] that Davidson's *Geographical Pathology*, published in 1893, while showing the prevalence of cancer in Europe and the United States, affirms its rarity or entire absence in Arabia, East Central Africa, Bechuanaland, Faroe Islands, Gold Coast, Guiana, Iceland, Jamaica, Mauritius,

---

[1] See Taylor, loc. cit.

[2] Cancerous and Other Tumors. By Herbert Snow, M.D. London, Ballière, Tindall & Cox, 1898.

New Caledonia and Persia, with a conflict of testimony with respect to Abyssinia.

Concerning the prevalence and increase of these affections in the most highly civilized countries, the testimony is exact and most startling. The figures given by the Registrar-General's Report for England and Wales during thirty-one years (see Chart IX.) show that there has been an increase from 38.5 persons dying from cancer in 100,000 living population in 1864 to 75.5 dying from cancer in 100,000 living in 1895—in other words, the ratio of the mortality from cancer has almost exactly doubled in England and Wales during the thirty-one years preceding 1895. Snow states that the deaths from cancer in Ireland in 1864 were 1498, with a population of 5,678,307. In 1884, with a decrease of population to 4,962,693, an increased mortality from cancer of 1947 is recorded. In Scotland the population in 1864 was 3,118,701, with 1300 victims of cancer; in 1884 the population was slightly increased, and the cancer mortality was 2110.

The condition of affairs is probably becoming quite as bad in America, and, in a recent paper,[1] Roswell Park makes the prediction that if the present rate of increase of cancer in New York State continues during the next ten years its mortality will become greater than that of consumption, typhoid fever, and smallpox combined.

The accuracy of these deductions has been more recently challenged by Edmund Andrews, of Chicago,[2] on the grounds that the population figures are inaccurate, and that no allowance has been made for a lessened mortality of young people which has been achieved during recent years in most civilized countries. He shows that the average age of those dying in Chicago of all affections has been nearly doubled in twenty-six years.

These objections of Dr. Andrews are twofold, and need separate consideration. His only objection to the deductions from the ratio of cancer deaths to the living population are the inaccuracy of census reports, both as to mortality statistics and population. The inaccuracy of the census mortality reports is freely granted by the present writer, as it is evident that they are based on the most insufficient and inadequate data in the portions of the country where burial certificates are not required, and, until the last day of the enumeration no report will contain even the hearsay evidence of the whole year in that district.

But to claim that our population counts of living persons are not sufficiently accurate for this purpose is decidedly hypercritical. Assuming their reasonable accuracy, the remainder of the objection to the comparison of cancer deaths to living persons is effectively set aside by the statistics which I have gathered from a number of the large cities of the United States in which the registration of the causes of death has been obligatory for many years, and which are here collected and published for the first time. The population of these cities for intercensus years is merely estimated, it is true; but these estimates have been frequently checked off by municipal enumerations. As no decedent can be buried in these cities without certification and registration, it is evident that the total deaths from cancer mentioned in the tables for each year have only one source of inaccuracy, and that is a mistaken diagnosis on the part of the attending physician; and in an affection so easily diagnosticated in its last stages by mere laymen, this source of inaccuracy must be small indeed.

---

[1] Medical News, April 1, 1899, vol. lxxiv. p. 385.

[2] Journal of American Medical Association, June 24, 1899.

When the number of cancer deaths in each of these cities for a period of years is reduced to the ratio per 100,000 of living population, and the ratios are represented on graphic charts, a mere glance will show that the proportion of cancer deaths to the living population is on the increase in all of these cities, and in each city the increase is shown to be so gradual and sustained that there can be but one conclusion drawn from the figures. The charts show, also, by means of a dotted line, the ratios of cancer deaths to each 1000 of all deaths in each city. These figures show a sustained increase for each city also, though not so great an increase as the ratios per living persons.

It is true, that the population figures, on which the ratios in these charts are based, represent total populations and not merely the number of adults living above thirty-five years of age. It has been impossible to get these corrected populations, and it is probable that such a correction of the figures would lessen the ratios somewhat, though not materially.

Dr. Andrews' objection to the ratio of cancer deaths to the total deaths needs more careful study. It is evident that a lessened number of deaths from certain preventable and curable affections of early life might give rise to an artificial increase in the proportion of a disease of maturer years which has not been prevented or cured. But if this is the cause of the increase of the ratio of cancer deaths to the total deaths, this increase should be even greater than that compared with the living population.

There can be but one conclusion from a careful consideration of the fact that the ratio per living population, which shows the actual increase in cancer, is greater than the ratio to total deaths in a lessening death-rate, and that is that some other disease or diseases of mature life are also on the increase. It is likely that these other affections are diseases of the kidneys and of the heart.

The American mortality rates of cancerous affections given in this paper represent the first compilation that has been made from the registration returns of the cities mentioned and are official, having been prepared for me by the statistical officers of the departments of health of each city. The figures in the earlier years are doubtless somewhat smaller than they should be, owing to the possibility of primary malignant diseases of the stomach and of other internal organs having been returned incorrectly, but this could not have been so of deaths from secondary internal growths following external cancers, where even a layman can make a correct diagnosis. The increased diagnostic ability of the profession in the detection of primary internal cancer must, therefore, count for something in considering these figures, but no reasonable person will believe that this element of uncertainty could have had any serious effect in causing so regular and even an increase in the deaths attributed to cancer throughout American cities, and the conviction is warranted that there is a wide-spread increase in the causes of these affections, or the liability to acquire them, throughout the country.

It appears from these tables that the greatest increase has occurred in the city of San Francisco, where the ratio has crept up from 16.5 cases in 100,000 population in 1866 to 103.6 cases to 100,000 in 1898. This enormous increase of more than six times as many cases in thirty-two years is deserving of special attention by the people of that city.

The city of Boston shows the next most considerable increase, the ratio of cases to living persons having almost trebled in the twenty-four years between 1863 and 1887. After the latter date there was a temporary decrease, followed by a tendency to increase to the present time.

In Chart VIII. the writer has combined the figures given in the seven preceding charts, this chart representing, therefore, the combined cancer mortality of the seven largest American cities, exclusive of Chicago, whose records were probably considered by its officials of too recent date to be valuable in this connection. The years from 1870 to 1898 only have been included in this chart, which, therefore, must be a reasonably accurate record of cancer deaths under modern conditions of diagnosis. The chart shows that in these seven American cities, with a combined population in 1870 of 8,207,464, there were 999 deaths from cancer, or 35.4 deaths per 100,000 living persons. In 1898 the population of the same cities, inclusive of Brooklyn, now a portion of New York, was 7,035,235, and there were 4273 deaths from cancer, or 66.4 deaths per 100,000 living persons, showing that the ratio of cancer deaths to the living inhabitants of these cities had almost doubled in the comparatively short time of twenty-eight years.

Believing that the registration of deaths in these seven cities has been reasonably accurate in recent years, and that the large aggregate population tends to eliminate mere chance, the writer has ventured to reproduce in the broken line in this chart the mean increase if the same rate of increase is maintained until the year 1910, showing that under these conditions there will be an average of 80 deaths in each city in that year to every 100,000 living persons.

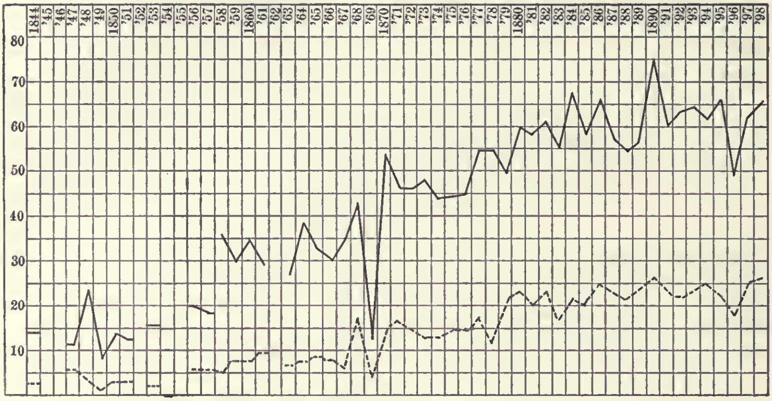


CHART I. NEW ORLEANS.

Representing the mortality rates of cancer in the city of New Orleans during fifty-four years. The continuous line shows the number of deaths from cancer per 100,000 living persons in the years represented by the vertical spaces. The broken line represents the number of cancer deaths in each 1000 deaths from all causes in the same years. The figures for some of the earlier years are wanting. (From figures kindly furnished by Dr. Sidney F. Théard, Secretary of Board of Health, New Orleans.)

Chart IX. is a graphic representation of the same figures for England and Wales, as given in the returns of the Registrar-General of

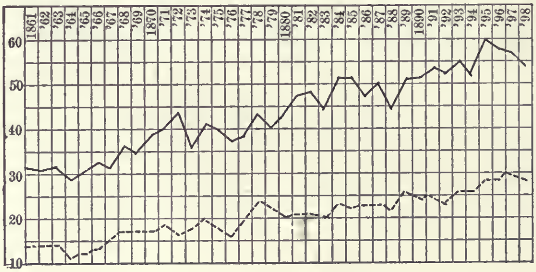


CHART II. PHILADELPHIA.

Representing the cancer mortality rates in Philadelphia during thirty-nine years. The continuous line shows the number of cancer deaths per 100,000 living persons; the broken line the number of cancer deaths per thousand deaths. (From figures kindly compiled by J. V. P. Turner, Registration Clerk of Board of Health, Philadelphia.)

Great Britain, showing that these diseases are more prevalent in that country than has yet been shown to be the case in America, though the rate of increase, which amounts to a doubling of the figures in about a generation, is practically the same in both countries. The sustained steadiness of the increase when large numbers of cases in a large population are studied is well shown in this chart.

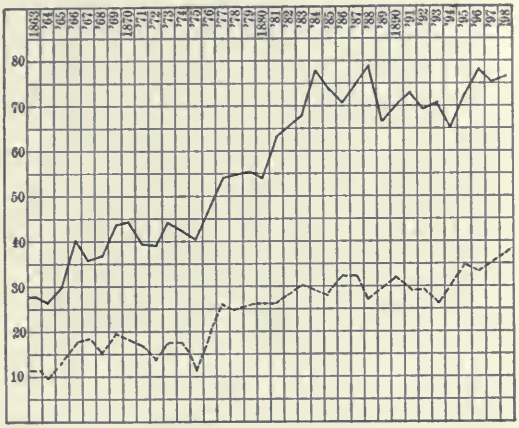


CHART III. BOSTON.

Representing the cancer mortality rates in Boston during thirty-five years. The continuous line shows the number of cancer deaths in 100,000 living persons; the broken line the number of cancer deaths per thousand of all deaths. (From figures kindly furnished by the Registrar of the Board of Health, Boston.)

There remains but one other inquiry answerable in these figures to impress the importance of this subject on the medical profession and on humanitarians in general, and that is: What indications do these figures give of the number of living persons that now suffer from these affections? All the foregoing statements refer to deaths alone. What of the living? To approximate the number of persons now suffering from cancerous affections in the United States, in the absence of reports, it is safe to assume that, since the average life of a case is in the neighbor-

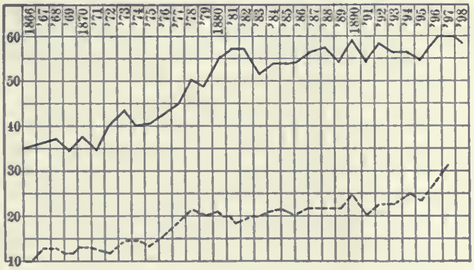


CHART IV. NEW YORK CITY.

Representing the cancer mortality rates in New York City during thirty-two years. (From figures kindly furnished by Dr. Roger S. Tracy, Registrar of Records, New York City.)

hood of two years, there must be twice as many living at a given moment as will die during the year. Now, according to the combined table of seven American cities given in this article there were 664 deaths per

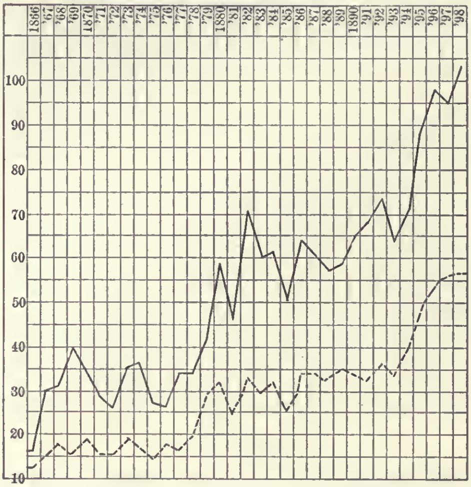


Chart V. San Francisco.

Representing the cancer mortality rates in San Francisco during thirty-two years. (From figures kindly furnished by Dr. W. H. Griffin, Health Department, San Francisco.)

1,000,000 inhabitants in 1898. Extending these figures to the 75,000,000 inhabitants of the whole country (and it is well known that there is

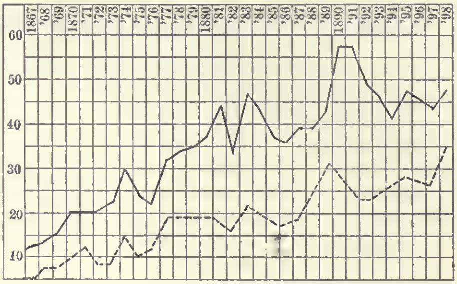


Chart VI. St. Louis.

Representing the cancer mortality rates in St. Louis during thirty-one years. (From figures kindly furnished by Dr. Max C. Starkloff, Health Commissioner, St. Louis.)

even a greater relative number of cases in rural than in urban districts) shows that there must have been 49,800 deaths from cancer in the United States in 1898, and that at the present moment there must be about 100,000 victims of the disease within our borders. And this great army of sufferers is by no means made up of the aged and infirm. The greater number of the victims are attacked in the prime of life and while in the possession of vigorous bodily powers—some, indeed, even in youth.

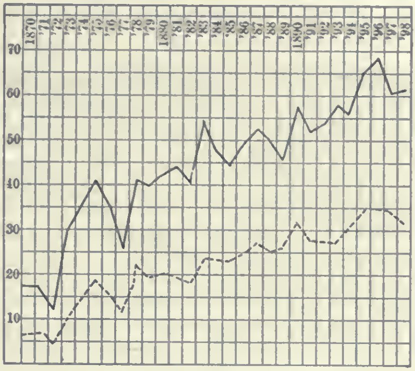


CHART VII. BALTIMORE.

Representing the cancer mortality rates in Baltimore during twenty-eight years. (From figures kindly furnished by Dr A. K. Hadel, Health Department, Baltimore.)

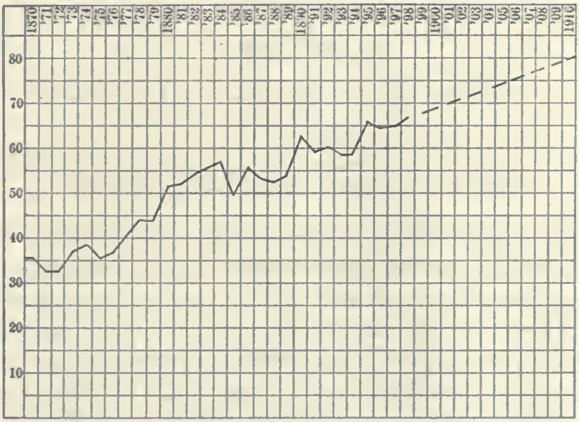


CHART VIII. COMBINED CANCER MORTALITY OF SEVEN AMERICAN CITIES.

Representing the combined ratios of cancer deaths per 100,000 living population shown in the preceding seven charts, to which is added a broken line showing the probable rate of increase until the year 1910.

What is being done for these unfortunates? Aside from operations in private and in ordinary hospitals, it may be said to be comprehended entirely in the establishment of one State laboratory of research and one special cancer hospital, and it is said that the general interest in the subject continues so apathetic that the latter institution does not confine its attention to cancerous diseases, but employs its facilities in other lines of surgical work.

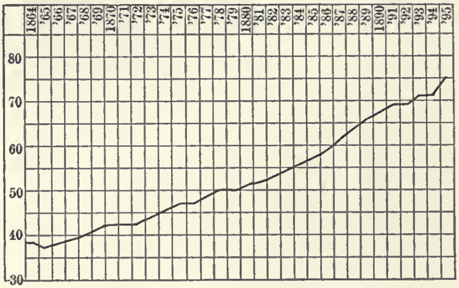


CHART IX. ENGLAND AND WALES.

Representing the rate of cancer mortality per 100,000 living persons in England and Wales during thirty-one years (drawn from the figures given by the Registrar-General).

NOTE.—The charts appearing in this paper are approximate representations of the tabulated figures. The tables themselves are too voluminous for these pages, but will be published elsewhere.

NARCOLEPSY.

A CONTRIBUTION TO THE PATHOLOGY OF SLEEP.

By D. J. McCarthy, M.D.,
ASSOCIATE IN WILLIAM PEPPER CLINICAL LABORATORY, UNIVERSITY OF PENNSYLVANIA;
ASSISTANT IN NEUROLOGY, PHILADELPHIA POLYCLINIC.

NARCOLEPSY, according to Gelineau, who first described the affection, is a peculiar neurosis characterized by an irresistible desire to sleep, occurring suddenly, of short duration, and recurring at frequent intervals. Repeated attacks of sleep, or deep somnolence, associated with a tendency to fall or sink to the floor, constitute the entire disease. That few of those who have written on this subject have agreed with him, either in this picture of the affection or its clinical significance, a short glance at the literature is sufficient to indicate.

Disturbances of sleep had long since been the *bête noir* of the clinician, and up to Gelineau's time had found no mention in the textbooks and but little in the literature. It is, therefore, not surprising that following the publication of Gelineau's articles many cases, widely different in their nature, should find their way into the literature under the name of narcolepsy. In many of these cases, at least, a careful clinical examination would probably have yielded a simple explanation in some underlying visceral or general functional disease. The era of enthusiasm yielded finally to the era of skepticism, and we find to-day Eichhorst speaking of narcolepsy, or narkoepilepsie, as one of the occurrences of epilepsy; Oppenheim, as a symptom of hysteria and epilepsy, and Lamacq denying the possibility of any such condition as hysteronarcolepsy, or epileptic narcolepsy, and attributing the condition to the derangement of function of some of the viscera. That there are, however, certain cases where the most careful examination by competent observers fails to reveal any underlying cause for the condition the work of Dana would seem to prove. I, however, believe with Ribakoff, that these cases occur in degenerate individuals, and that the recurring attacks of sleep are not the disease, but merely a syndrome occupying a prominent position among other phenomena of degeneration. The following cases illustrate to a certain extent the difference in the clinical picture in different cases, the difficulty of getting at the causative factors, and the importance of the establishment of the underlying disease in the treatment:

M. H., aged nineteen years, colored, was admitted to the clinic, complaining of paroxysmal attacks of sleep interfering with her household duties. Her family history was negative, except that her sister was also troubled with some disturbance of sleep, the nature of which was unknown to the patient. The disposition to fall asleep at irregular intervals began in her fourteenth year. Under the stress of some religious and emotional excitement she suddenly fell asleep and slept some time. She was easily awakened. Two years later, while asleep, she was suddenly awakened by a loud noise which was made to frighten her. She became very much excited, and the following day went into a sound sleep which lasted six hours. She was easily awakened during the progress of the sleep, but immediately fell sound asleep again. She considers both of these attacks natural sleep, and there is nothing in the history of the attacks to make us think otherwise. During last winter she had another sleeping attack, caused by the worry of her father's illness and the strain of nursing him. This attack lasted three hours. One month ago (May, 1899) she was sweeping the house, when an overpowering desire to sleep came over her, and she sank to the floor in a deep sleep which lasted six hours. Since then she has had similar attacks two or three times every week. The attacks come on suddenly, without any premonition except the sleepy feeling, which lasts a moment or so before she sinks to the floor and loses consciousness. There are no cries, no twitchings, no incontinence of urine or feces, and the patient lies perfectly relaxed. She is aroused with some difficulty, and afterward remembers that someone was talking to her, but seemed as if they were far away. She awakens refreshed and has no headaches or drowsy feeling. She sleeps from eight to nine hours every night, and dreams but little. Physical examination of the organs was negative, as was also the examination of the secretions. There was no trace of organic nervous disease. We thought at first that we were dealing with one of those rare cases of narcolepsy such as Dana described, especially as a cursory examination of sensation revealed no change. The patient answered perfectly every time she was touched with the finger, and differentiated the pin-point from the head of the pin. The left ocular conjunctiva, however, was anæsthetic, and this led us to re-examine the woman more carefully for sensation. While she could tell the point of the pin, it gave no pain when penetrating the skin—*i. e.*, there was an analgesia, gauntlet in type, affecting both hands. The mucous membranes were also analgesic on the left side. By comparing the sensation on the two sides of the body she felt the pin-point and pin-scratch much plainer on the right side, although differentiating well on both sides—*i. e.*, a light grade of hypæsthesia of the left side of the body. The boundaries of these sensory changes varied somewhat in the subsequent examinations.

Here, then, is the case of a young woman who considers herself otherwise in perfect health, subject to repeated attacks of morbid sleep, over which she has no control and for which she demands relief. It is easy to understand how the slightest carelessness in methods of investigation would have left uncovered the slight but wide-spread sensory changes which stamped the case one of hysteria and excluded the possibility of it being one of true narcolepsy.

Landouzy, by an examination of the urine in a case diagnosticated true narcolepsy by a number of clinicians, discovered large quantities of sugar, and pronounced the case one of diabetes mellitus with toxic manifestations producing the morbid sleep.

While instances of prolonged natural sleep, or pseudonarcolepsy hysterica, as it is often called, are by no means common in hysteria, yet they do occur, and hysteria shares with epilepsy in furnishing us with the majority of our cases of morbid sleep. Briquet could find in four hundred cases of hysteria only three cases of prolonged sleep, and there is little evidence to show that these could be ranged under the heading of narcolepsy hysteria. They were probably cases not of true sleep, but that condition of apparent unconsciousness in which the patient retains, semi-consciously, impressions from without, and may be subsequently resurrected by hypnotism or methods of abstraction.

The following case of hysteronarcolepsy presented herself at the clinic July 28, 1899:

S. C., female, white, aged forty-two years, was admitted, complaining of prolonged sleep extending over several days at a time. She comes from a very neurasthenic stock; otherwise her family history is negative. As a child she was very nervous, but enjoyed fairly good health until her nineteenth year. In September, 1895, during a discussion at a debating club, of which she is a member, she became greatly excited. She afterward felt very drowsy, and, in spite of all her efforts to keep awake, fell into a sound sleep at the close of the meeting. She slept continuously for three days. She remembers very distinctly the visit of the doctor to the club and his visits at her home. She also remembers being aroused to take her medicine, but retains nothing of the rest of the period of her long sleep. For three weeks following this attack she was unable to feed herself, although there was no paralysis. When she recovered sufficiently to get out of bed she was unable to walk, but recovered the use of her limbs after a few days' teaching on the part of her sister. She returned to her work of "shirt-operating," and worked three days. She became so exhausted upon the slightest effort that she gave up her place, and for the following week slept the entire time. She was aroused in the evening and kept awake for an hour or so, but was compelled to yield to the overpowering desire to sleep, and remained in deep slumber until the next evening, when the same process of arousing her and keeping her awake was gone through again. During this entire time she dreamt but little, and neither she nor her sisters were able to detect any difference between this and normal sleep. She recovered her normal tired state, but was unable to do any work on account of the exhaustion it produced. Three months later she attempted to waltz one evening, and fell asleep during the dance and sank to the floor in a deep sleep which lasted several days. A year's sojourn in the country freed her from any trouble until March of the present year. An attack of major hysteria, with screaming, laughing, opisthotonos, etc., occurred, and since that time sleeping periods of days at a time have been the rule. For the last three weeks she has slept twenty-three hours out of the twenty-four, and would remain asleep indefinitely were it not for the efforts of the family, who were afraid she would die of inanition. Her sisters pull her out of the bed and compel her to take some food, but she goes back to bed as soon as the meal is finished, and remains there until the next evening. It took at least three hours to dress to come to the hospital. She would fall asleep in the process of putting on a garment, and would have to be awakened to complete her dressing. There is no organic disease, but her general nutrition is very low, and she is thirty-four pounds below her best weight. The muscles are flabby and wasted; the tongue is coated, the breath foul, and constipation is marked. The skin is sallow and covered with acne, and she has a very melancholic expression. Reflexes are active; no ankle clonus, and there are no disturbances of sensation. She always feels tired, and has "never enjoyed herself for five minutes that did not require several days' sleep for recuperation."

Besides the hysteria in this case we have the neurasthenia and possibly a beginning melancholia as factors in the production of the sleep. There can be little doubt that the woman's present condition depends as much on the neurasthenia as the hysteria, but the history of the case demonstrates that the onset of the trouble was hysterical in nature. Why we should differentiate the marked sleep of hysteria from the lethargy of hysteria and hysterical unconsciousness is not distinctly clear, as they are all manifestations of the same disease and demand the same treatment. The French school, however, tells us that we should not confound these several conditions. Hysterical sleep, or hysterical unconsciousness, according to Charcot, is an attack of hystero-epilepsy modified—an equivalent to the grand attack with which it alternates.

The patient retains a "souvenir" of what passes on about her, and the muscular twitchings, subdued cries, irregularities in respiration, etc., indicate the suppressed motor elements of the grand attack. In hystero-narcolepsy, on the other hand, the patient is lost in the forgetfulness of natural sleep, and the muscular twitchings, irregularities of respiration, etc., are wanting.

In many of these cases the period of sleep is filled with vivid dreams. In this respect they resemble the sleep of neurasthenia, with which, as in the case of S. C., the hysteria may be associated. In such cases an already exhausted nervous system attempting to recover from an expenditure of energy which it can ill afford seems to be a rational explanation for the prolonged sleep. The treatment of such cases is to change the vicious, deranged metabolism of the individual by eliminating the element of copræmia from the overloaded bowel; to change the tone of the muscles, and to correct, as far as possible, by massage and graduated exercises, the all-important muscle-metabolism; and, finally, by complete rest and judicious feeding, to build up the entire system and with it the exhausted and deranged nervous system. There is no reason why the patient should not sleep; but this need not interfere with the massage and the feeding of the patient.

The differential diagnosis of the hysterical states detailed above is not of so much importance as the differentiation of hysterical conditions, as a class, from the other conditions of the organism which produce morbid sleep. These may be divided into two classes:

1. The epileptoid sleeping states, such as *petit mal*, epileptic equivalent, etc., and

2. The morbid sleep depending on toxæmic states and disturbed cerebral circulation and nutrition, which cannot very often be separated from each other. To this class belong the somnolence of uræmia, cholæmia, etc.; of cardiac and pulmonary diseases; of organic brain disease and arterio-sclerosis; of toxic products from without, as opium, etc.; and, finally, the cerebral exhaustion of typhoid and some blood diseases.

The epileptoid sleeping states are easily recognized, as a rule, by the sudden onset of the sleep, often with an aura; the complete unconsciousness during the attack, and the usual sequelæ of epileptic occurrences, such as headache, confusion, etc. The following is a case of *petit mal:*

M. G., male, aged eighteen years, developed at puberty peculiar attacks, as follows: After awakening from a sound sleep he will walk a few steps and fall to the floor unconscious. He remains unconscious several minutes, regains his feet and walks for a few steps, and falls again unconscious; this is repeated fifteen to twenty times. There are no auræ, no twitchings, no headaches. These attacks lasted three years, when he developed typical *grand mal*, and lately he voids his urine in both attacks.

The somnolence of uræmia, etc., develops so late in the disease that the routine clinical examination reveals the underlying cause. Somnolence, stupor and coma are frequent symptoms of organic brain disease, but any of these symptoms occurring early and occupying the foremost place in the clinical picture should suggest the gray areas surrounding the third ventricle as the seat of the lesion.

The following case illustrates the intimate relation existing between the toxæmic states and states of disturbed cerebral nutrition and circulation, and the difficulty in separating them:

O. M., aged sixty-two years, pavior, suffered from the toxic effects of tainted meat one year ago; gastro-intestinal disturbances, vertigo, and later a severe multiple neuritis were the symptoms presented. He still suffers from the effects of the multiple neuritis. For the last two months he has developed a disposition to fall asleep at all times and in all places, that alarms himself and his family. Every time he remains quiet a few minutes he falls asleep and sleeps from ten to fifteen minutes. After sleeping eight hours during the night he would fall asleep after breakfast if he remained quiet. Station is good; gait is senile and unsteady. There is hypertrophy of the heart, arterio-sclerosis, and the urine contains narrow, granular casts. An encephalitis affecting the central gray matter, and caused by the meat poison, could cause such symptoms, but we would expect other evidences of brain-disease than the vertigo. We would, at least, expect some nuclear involvement of the cranial nerves. Eye-tire could hardly cause such symptoms, as he rarely reads or uses his eyes for fine work. Defective cerebral nutrition from arterio-sclerosis, assisted by some uræmic poison, could, and probably does, cause the peculiar recurrent periods of sleep in this case.

I have found nothing in my studies of sleep and its disturbances in this clinic to support the idea that the condition known as narcolepsy is a distinct neurosis or disease. In the only autopsy report out of eighteen cases collected by S. Weir Mitchell there was simply "no lesion." In Dr. Mitchell's case he found "starch-corpuscles in the ventricular serum and in those portions of the gray matter submitted to examination." I feel quite certain that a microscopical examination of the brain of such cases of prolonged sleep as that lately reported by Skerrit and Stewart, where the patient recovered from a sleep of fifty days with inco-ordination and other symptoms of brain-lesion, would reveal cellular changes.

The sleeping sickness of the negroes of Africa has not been considered in this paper, because it is such a rare occurrence in this country. It is due to a filaria, and probably depends on some poison generated by it in the blood.

I am indebted to Dr. W. G. Spiller for the privilege of reporting the cases presented in this paper from his clinic at the Philadelphia Polyclinic.

BIBLIOGRAPHY.

Ballet. Rev. de Méd., 1882.
Blocq. Rev. de Neur., 1893.
Camusset. Gaz. hôp., 1880.
Charcot. Gaz. hôp., 1888. Leçons du Mardi, 1888, 1889.
Dana. Journ. of Nerv. and Ment. Dis., 1884.
Dehio. St. Petersburg med. Woch., 1893.
Drosdow. Arch. f. Psych. und Neur., xiii.
Erven. Boston Med. and Surg. Journ., 1893.
Féré. Sem. Médical, 1893. Rev. de Méd., 1891, 1898.
Fischer. Arch. f. Psych., viii.
Faab. Dublin Journ. of Med., 1886, p. 465.
Gairdner. British Med. Journ., 1878, p. 225.
Gelineau. Gaz. hôp., 1880.
Gilles de la Tourette. Arch. de Neur., 1893, xv.
Kitrég. Berl. klin. Woch., 1862.
Jacoby. New York Med. Journ., 1893.
Landouy. Cited by Lamarq.
Lange. Rev. de Neur., 1896.
Levi. Arch. Gen. de Méd., 1896.
Loney. New York Med. Record, 1888.
MacNamara. Dublin Journ. of Med., 1862.
Mitchell, S. Weir. Trans. Coll. of Physicians of Philadelphia, viii. (new series).
Mauthner. Wien. med. Wochens., 1890.
Mendel. Deut. med. Woch., 1880.
Morton. Journ. of Nerv. and Ment. Dis., 1884.
Parmentier. Arch. Gen. de Méd., 1891.
Poster. New York Med. Record, 1888.
Skerrit and Stewart. Brit. Med. Journ., 1898, No. 1970, p. 957.
Sahlmen. Berl. klin. Woch., 1881.
Ribakoff. Rev. de Med., 1897.
Siemens. Arch. f. Psych., 1879.
Harp. New York Med. Record, 1890.
Ware, Cousins. Med. Times and Gaz., 1863.
Westphal. Arch. f. Psych., xiii.

A CRITICAL SUMMARY OF LITERATURE

ON

THE INFLUENCE OF HEREDITY ON DEAFNESS.*

BY W. SCHEPPEGRELL, A.M., M.D.,
PRESIDENT OF THE WESTERN OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL ASSOCIATION, ETC., NEW ORLEANS, LA.

THE subject of heredity as applied to deafness is worthy of earnest investigation not only because the subject itself is of importance, but also on account of the lack of unanimity of the views on this subject. Not only is there a wide divergence of opinion as to the influence of heredity upon deafness, but even the reports and statistics which have been published, and which form the foundation of these opinions, vary within such extensive limits that they cannot be explained by ordinary social environments or geographical distribution. As illustrating this difference of opinion, Bell,[1] who has contributed much to this subject, believes that the evidence which he has collected shows a tendency to the formation of a deaf variety of the human race in America, while the Commissioners of the Irish Census of 1881, in making their report, state that "it appears evident that the question of deaf-mutism in parents has no influence in propagating the defect." Between these two extremes as to the influence of heredity stand many authors, some of whom incline to one and some to the other opinion, so that the systematizing of this subject presents no little difficulty.

---

* Read before the Louisiana State Medical Society, New Orleans, May 18, 1899.

The relation of deafness as an essential factor in deaf-mutism is not generally understood, and a considerable proportion of the laity believe that mutism is due to some defect in the organs of speech. It is not an uncommon occurrence to have a child presented to have its mouth and throat examined, the parents being under the impression that there is some defective development or paralytic condition of these parts, when the real cause is in the auditory apparatus. These persons are slow to realize that hearing is essential in the normal development of speech, and that the child could not be expected to repeat sounds which it had never heard.

An examination of the literature previous to the latter part of the sixteenth century indicates that the relation of deafness and mutism was not realized, and that deafness in deaf-mutes was considered a complication or a condition arising from the same cause as the mutism. The first indication that the relation of cause and effect existing between deafness and mutism was understood is shown in the writings of Pedro de Ponce,[2] in the latter part of the sixteenth century. As illustrating the important bearing which the knowledge of the true nature of a disease or a defect has on its treatment, De Ponce no sooner realized that mutism had for its *raison d'être* the inability to hear, when he initiated methods for the development of speech in these cases, and with some satisfactory results.

Previous to this period the writings indicate that no relation was suspected between the absence of speech and of hearing in the deaf-mute. So astute a philosopher as Hippocrates believed that mutism was due to the fact that the patient could not use his tongue for articulate speech and Aristotle found in the accompanying deafness an affection of the ear dependent upon the same cause as the defect of speech, their relationship as cause and effect remaining unsuspected.

While some attention was given to this subject in the seventeenth and eighteenth centuries, it is only comparatively recently that any considerable interest has been manifested and any attempt made to investigate the subject on a scientific basis. Among those whose writings have been of value in this connection may be mentioned Itard,[3] Ménière,[4] E. Schmalz,[5] Wilhelmi,[6] Wilde,[7] Meissner,[8] Toynbee,[9] Hartmann,[10] Hedinger,[11] and H. Schmaltz,[12] the majority of these having investigated the subject more from the stand-point of the teacher of deaf-mutes than that of the otologist.

In studying the subject of deafness as applied to heredity, it is well to define the limits within which the term deafness is here used. In some cases the deafness is so complete that no sounds whatsoever are heard, the proportion among the congenitally deaf having been estimated at about 39.7 per cent., and among those who have acquired deafness since birth about 48 per cent. Certain loud noises, such as the firing of guns, etc., may be perceived by these persons, giving the impression that they have been heard. The concussion in these cases, however, is so great that the vibrations may be perceived by the tactile sense of the skin, especially since in the deaf and blind the unaffected senses are usually more acutely developed. It has also been shown by Egger, in a recent communication before the Société de Biologie,[56] that sonorous waves may be transmitted by the nerves of general sensibility. This faculty, which is usually but little developed in the normal individual, is susceptible to education, and becomes quite marked in the deaf-mute who is totally deaf. Egger claims that this transmission is not effected by the superficial or cutaneous nerves, but rather by the musculoperiosteal terminations of the deeper nerves.

In deaf-mute institutes there are many cases in which noises of greater or less intensity may be heard, and yet in which the hearing is so defective that the child fails to develop speech in the normal manner. The term "deafness," therefore, as used in this article, will be limited to cases in which the ordinary methods of teaching speech are not applicable.

In considering the subject of deafness two classes are presented—that of congenital and that of acquired deafness. The former refers to abnormalities in the function of hearing existing at birth; that is, during the development of the fœtus. These abnormalities have been demonstrated by post-mortem examinations. Congenital deafness, however, is by no means of common occurrence, and many of the cases are so considered simply for lack of sufficient evidence to the contrary. As opposed to this, however, there are some cases of deafness, really of congenital origin, which are attributed to disease, owing to the fact that parents are loath to admit that the child was born with some abnormality.

While the statistics of this subject vary within considerable limits, the average of the reports of the various institutes for the deaf and dumb show that in two-thirds of the entire number the deafness was acquired, leaving one-third as being congenitally deaf. In America and Great Britain the number of congenital cases has been estimated to be about one-fourth.[13] The real proportion of acquired cases, however, is probably greater, as cases in which the disease causing the deafness cannot be ascertained are entered in the list of congenital deafness. In many cases, however, a disease in infancy appears of no great intensity, and yet wreaks such havoc on the delicate auditory apparatus that the hearing is destroyed. If this takes place before the child has learned to speak, and especially before the faculty of attention is well developed, the effect on the ears, if unattended by some external signs, may be unobserved, and the case considered as one of congenital deafness.

In a series of cases examined by Lemcke[14] deaf-mutism was acquired in 55 per cent. of the total number. Roosa[15] estimates this number at 50 per cent., while Mygind,[16] from an investigation of 210 cases, found that 110 were acquired and 54 were congenital, the remaining cases being uncertain. The report of the Michigan Asylum for the Deaf and Dumb, at Flint, fixes the proportion of congenital deafness much lower, as it shows that in 75 per cent. of the cases the deafness was acquired.

That many cases of supposed congenital deaf-mutism are due to pathological processes in infancy is demonstrated by the fact that in some of these cases perforations, adhesions and other sequelæ of pathological conditions exist, showing that the deafness was acquired. Politzer[17] found this to be the case in many instances of supposed congenital deafness, and Schmalz,[5] in a series of investigations, found that in 16.2 per cent. of the cases supposed to be of congenital origin, objective changes in the hearing apparatus could be shown. As further illustrating the difficulty in deciding this point, Schmalz found in 39 per cent. of the cases of acquired deaf-mutism no visible trace of any affection of the ear. While the probability is that in these cases the pathological process affected some part of the auditory apparatus, such as the cochlea or auditory nerve, the evidence of which does not appear in the ordinary physical examination, still it may also indicate that the deafness was really of congenital origin.

The difficulty of distinguishing between congenital and acquired deafness is, moreover, aggravated by the fact that the lesion resulting in the loss of hearing may be caused during birth, especially when this is accompanied by instrumental delivery. While the number of these cases is probably small, their actual existence has been demonstrated by Lent[18] and Wilhelmi.[19]

The report of cases of deaf-mutes, showing the proportion in which no hearing could be demonstrated, presents even a greater divergence than the statistics of congenital and acquired deafness. In a series of most careful tests of the hearing of one hundred deaf-mute children

Urbantschitsch[20] found only three who were absolutely deaf. Other authors, however, have found the percentage of the totally deaf much greater. Hartmann,[10] for instance, estimates this at 16.2 per cent., Uchermann[21] at 30.3 per cent., while Lemcke[22] found in the institute which he examined 20.8 per cent. entirely unresponsive to the tests which were used. Bezold[23] found the proportion even much higher, as among seventy-nine deaf-mutes whom he examined forty-eight were apparently totally deaf.

This striking difference in the estimates of the totally deaf, as compared with deaf-mutes in whom there is still some remnant of hearing, can be accounted for only by the fact that different methods were used in testing these cases. This illustrates the necessity of having uniform standards of testing, which should apply not only to the intensity of the sound, but also to the quality and pitch, as each of these is important in these cases.

The greatest care, patience, and perseverance are required in making these tests, as many of the subjects are of an age when their natural intelligence is not yet sufficiently developed to be of any assistance. It is usually necessary to divert the child in some manner, so that when the test is applied the fact that it is heard is shown by the child turning toward the direction of the sound. The accuracy of the test will therefore vary inversely as to the interest that the child manifests in the object which is diverting its attention. Even if there is some remnant of audition, the fact that this function has been lying dormant, and has not been exercised, has an important bearing. The large proportion of deaf-mute children in whom some remnant of hearing could be demonstrated, reported by Urbantschitsch, is no doubt due to the fact that at the very earliest age he commenced the exercise of the hearing by various means, so that when the tests were made the auditory nerve responded much more rapidly than would have otherwise been the case.

The tests ordinarily applied vary considerably: Hartmann used a table-gong; Toynbee, the clapping of the hands; Hedinger, Galton's whistle, and Urbantschitsch, a harmonica with a range of five and a half octaves.

The tests which I have found the most efficacious in these cases consist of the following: A snapper similar to that used for teaching pupils in telegraphy, but of a larger size; a whistle of high pitch and containing a ball to change the vibrations; a series of automatic bells, varying in pitch and made somewhat like those used by the bicyclist. With these tests I have been able to demonstrate hearing in cases that have been found totally deaf by other aurists. The variety of tests given above, however, explain to some degree the difference in the reports of the proportion of the totally deaf to those in whom there is a remnant of hearing.

When deafness is congenital, or acquired at an age when the child has not yet learned to speak, mutism necessarily follows unless one of the artificial methods of teaching speech is practised. Even if the child has acquired some rudimentary words, as "mamma" and "papa," these sounds are gradually forgotten. In fact, it may be stated that if the deafness develops before the age of seven the speech already acquired gradually becomes less fluent, rougher and less distinct, and, unless educational methods are used to overcome the tendency, mutism will ultimately result.

Early infancy is a predisposing factor in the development of acquired deafness. The delicate mechanism of the hearing apparatus easily falls a victim to the many diseases to which infancy is subject, and statistics show that about one-half the number of cases in the institutes for the deaf and dumb develop before the fourth year.

Of 503 cases of deaf-mutes examined by Wilde[24] the deafness appeared in 120 before the third year, the majority of these during the second. It appeared between the third and fourth year in 129 cases; in the fourth in 76 cases; in the fifth in 38; in the sixth in 36; in the seventh in 32; in the eighth in 21; in the ninth in 11; in the tenth in 15; between the tenth and fifteenth in 33; and after the fifteenth year in 12 cases.

Among the congenital abnormalities which may result in deafness are malformations of the labyrinth, as the absence of the fenestral openings, defective formation of the vestibule and of the semi-circular canal or cochlea, defect or excess of otoliths, absence or lack of continuity of the auditory nerve, absence of the external auditory canal; or there may even be anomalies in the development of the nervous centres of the organ of hearing. There may have been inflammation of the labyrinth or middle ear during uterine life,[25] and even meningitis may develop at this period, destroying or injuring the function of hearing.[26] It may also, in exceptional cases, be due to atrophy and degeneration of the acoustic nerve, as determined by Mygind.[27]

In the earliest embryonic life the drum membrane is entirely absent, closure finally taking place at the upper part. An arrest of development may leave an opening at this point similar to the abnormality shown in cleft palate and harelip. While this alone would be insufficient to develop total deafness, still it leaves the middle ear exposed to inflammatory processes, lessening its resistance and making the patient more liable to diseases affecting the hearing.

Among the most important causes of acquired deaf-mutism are pathological conditions of the labyrinth or auditory nerve, due to cerebral disease, meningitis or epidemic cerebro-spinal meningitis, hydrocephalus,[23] inflammation of the labyrinth, syphilis, traumatism, mumps,[28] scarlet fever, enteric fever, typhus fever,[20] measles and diphtheria.[31]

Ordinary pathological conditions of the middle ear, resulting from catarrhal or purulent processes, are usually not so violent in their effects on the function of hearing as to cause total deafness. Moos[32] claims that inflammation of the middle ear, resulting in suppuration or adhesions and ankylosis of the ossicular chain, is an important factor; but, as already stated, total deafness resulting from this cause is extremely rare.

As illustrating the various causes to which deafness may be due, the following report of 546 cases examined at the Pennsylvania Institute for the Deaf and Dumb[33] will be of interest:

Scarlet fever	78
Cerebro-spinal meningitis	44
Meningitis	39
Measles	19
"Colds"	15
Convulsions	12
Traumatism	14
Otitis media	11
Typhoid fever	8
Spinal meningitis	8
Pneumonia	4
Catarrhal fever	4
Teething	3
"Malaria"	3
Black fever (?)	3
Cholera infantum	3
Diphtheria	2
Enteritis	2
Whooping-cough	2
Rhachitis	1
Smallpox	1
Shock	1
Mumps	1
Bronchitis	1
Sunstroke	1
Croup	1
Eczema	1
Unrecorded	8
Unknown cause	58
"Deaf from birth"	200

It will be noted that two hundred of the cases are reported as "deaf from birth." Some of these, however, may be cases of acquired deafness; for if the hearing is lost during the course of some illness before speech has developed, this point is not always easy to determine. It sometimes happens that during an attack of one of the exanthemata or other affections the symptoms presented in the little patient may appear comparatively slight; but the tender aural apparatus may be, nevertheless, affected to such a degree that the function of hearing is destroyed. As already stated, if this should occur before the development of speech the deafness will very probably be considered of congenital origin.

It should not be forgotten, however, that the inverse of this may also take place. If a child is born deaf and has an attack of scarlet fever, diphtheria or other disease which may affect the hearing apparatus, the deaf-mutism observed in later years may be ascribed to this as the most probable cause, whereas the case is really of congenital origin. While this is probably of rare occurrence, its possibility should not be overlooked in the tabulation of these cases.

As regards the proportion of the deaf and dumb to the population in general, statistics vary within considerable limits. In a paper read before the American Association for the Advancement of Science, Alexander G. Bell made the assertion that there was one deaf-mute to every

1500 of the world's inhabitants, while Hartmann[34] places the proportion as one to every 1414. The proportion in different countries also seems to vary, statistics showing that in Great Britain and Ireland there is one deaf-mute in every 1636;[13] in France, one in 1672;[35] in Prussia, one in 1730;[36] in North America, one in 1251.[37] According to George Mayr,[38] among 206,000,000 persons there were 152,751 deaf-mutes, the proportion varying considerably in different countries, the lowest average being found in the Netherlands, where the proportion is 3.35 per 10,000, while the highest is in Switzerland, 11.80 per 10,000. According to this author, the average of all countries is 6.72 per 10,000 inhabitants.

The following table[39] shows the number of deaf-mutes in different countries, the proportion of deaf-mutes to 10,000, the number of male and female deaf-mutes respectively, the number of female deaf-mutes per 10,000, and the number of women per 10,000 of the population:

Country.	Year.	Total population.	Deaf-mutes.	Deaf-mutes per 10,000.	Male deaf-mutes.	Female deaf-mutes.	Female deaf-mutes per 10,000.	No. of women per 10,000 of whole population.	Bibliographic references.
Switzerland . .	1870	2,669,147	6,544	24.5	....	....	......	....	38
Austria . . .	1880	22,144,244	28,958	13.1	15,935	13,023	8.2	10.47	40
Hungary . . .	1881	15,642,102	19,874	13.7	10,589	9,255	8.3	10.28	41
Baden . . .	1871	1,461,562	1,784	12.2	942	842	8.9	....	38
Alsace-Lorraine .	1871	1,549,587	1,724	11.1	977	747	7.6	....	38
Würtemberg . .	1861	1,720,708	1,910	11.1	1,019	891	8.7	....	38
Sweden . . .	1880	4,565,668	4,834	10.6	2,681	2,153	8.0	10.61	42
Prussia . . .	1880	27,279,111	27,794	10.2	15,168	12,626	8.3	10.33	43
Finland . . .	1880	2,060,782	2,098	10.2	1,183	915	7.7	....	44
Norway . . .	1886	1,922,105	1,826	9.5	1,029	797	7.7	10.61 (1880)	45
Bavaria . . .	1871	4,863,450	4,381	9.0	2,252	2,129	9.4	....	38
Ireland . . .	1881	5,174,836	3,993	7.7	2,163	1,830	8.7	10.45	46
Portugal . . .	1878	4,161,980	3,109	7.5	1,799	1,310	7.3	10.91	47
Greenland . .	1879	1,679,551	1,085	6.5	....	....	......	....	48
Denmark . .	1886	1,969,039	1,255	6.4	645	610	9.5	10.35	49
Saxony . . .	1880	2,972,805	1,747	5.9	941	806	8.6	10.57	12
France . . .	1876	36,905,788	21,395	5.8	11,460	9,935	9.7	10.09	50
Scotland . . .	1881	3,933,300	2,142	5.7	1,149	993	8.6	10.77	51
Italy . . .	1881	28,461,681	15,300	5.4	8,707	6,593	7.6	....	52
England and Wales	1881	25,974,439	13,295	5.1	7,111	6,184	8.7	10.57	53
Spain . . .	1877	16,623,384	7,629	4.6	4,625	3,004	6.5	10.44	54
Belgium . . .	1875	5,336,185	2,280	4.3	1,208	1,072	8.9	9.95 (1866)	38
Holland . . .	1879	3,575,080	1,199	3.4	629	570	9.1	10.23	38
Total . .	......	222,646,534	176,156	7.9	92,212	76,315	8.27		
United States . .	1880	50,155,783	33,878	6.8	18,567	15,311	8.2	....	55
Total . .	......	272,802,317	210,034	7.7	110,779	91,626	8.271		

From these tables it appears that deaf-mutism is more common in the male sex, all statistics agreeing on this point. While this has been explained in various ways, it has not been satisfactorily accounted for. A noticeable feature is that the ratio for the United States is placed at 3.82 per 10,000, a proportion of one to 2617 inhabitants, whereas the majority of statisticians place this proportion much higher, placing it at one in 1470,[39] and another at one in 1251.[37]

A careful study of these tables, while showing that the average number of deaf-mutes is 7.7 per 10,000 for the total inhabitants of the countries listed in the tables, the proportion for the individual countries varies from 3.4 per 10,000 (Holland) to 24.5 per 10,000 (Switzerland), the remaining countries ranging between these two extremes. So great a difference is difficult to explain on any scientific basis, and the great discrepancy must be due to some defect in the method of collecting these statistics, as it is improbable that such a difference is due to climatic conditions or social environments.

Locality, however, seems to be of some importance in deaf-mutism as well as in certain diseases. It has long been known that cretinism is of common occurrence in mountainous regions, and deaf-mutism in these localities is also frequent. Ménière[57] refers to several places in the canton of Berne, Switzerland, where deaf-mutism and cretinism are found in a large proportion of the population. In his investigation of this region Mitchell[58] also found this to be the case.

The influence of heredity in the transmission of deaf-mutism has received considerable attention, but the opinions of various authors on this subject are by no means unanimous. This is not surprising when we find that many of the authors have not discriminated between congenital and acquired deafness, and that much of the material collected has been obtained from the relatives and friends of the deaf-mutes, the probability of error in such evidence being well understood. Deafness, moreover, has frequently been considered a malady by those who have investigated this subject, whereas it is simply the result of certain pathological or abnormal conditions, which may vary within considerable limits.

That heredity has a certain influence in these cases is probable from analogy, as the inherited predisposition to other maladies, such as tuberculosis, lithiasis and the various neuroses, is generally admitted. It is frequently observed, moreover, that certain formations of the external ear are found in the same family, such as abnormal flatness of the cartilage, a pointed instead of the usual rounded helix, and other peculiarities.

Deafness is sometimes the result of catarrhal disease of the nose and throat, and a predisposition to such diseases in certain families is by no means unusual. Recently, I found four out of a family of six children affected with a severe form of fetid atrophic rhinitis, and instances of this kind are not of infrequent occurrence.

Catarrhal diseases of the nose and throat as an etiological factor in deafness are well recognized. The tendency to develop certain ear diseases in a family in which some ear affection exists is of common occurrence. This predisposition is sometimes transmitted potentially, as the parents may appear perfectly healthy, but the disease may develop in one of the grandchildren. Although transmitted in this manner, the influence may be so strong that several of the grandchildren may develop the aural affection in succession. It is not improbable in these cases, however, that the predisposition in one parent is aggravated by a similar tendency in the other. Mitchell[59] even showed that this predisposition may be transmitted through three generations, and refers to a case in which neither parents nor grandparents were deaf, and yet the predisposition to deaf-mutism was transmitted through them potentially.

The subject of heredity in connection with deaf-mutism has been discussed in an interesting brochure on the subject of *Marriages of the Deaf in America*, by Edward Allen Fay, of Washington, D. C., and recently published by the Volta Bureau. The conclusions advanced in this communication are based on statistics which have been tabulated in the most careful manner and obtained from all available sources. It appears from these statistics that marriages of the deaf are somewhat, but not much, less productive than other marriages, this being more marked in the congenitally deaf.

While it is generally admitted that marriages of deaf persons, one or both partners being deaf, are far more likely to result in deaf offspring than those in which both of the partners are hearing persons, it is shown in these tables, as well as in those of other investigators, that marriages of deaf persons are far less likely to result in deaf than in hearing offspring, not more than 25 per cent. of the children being born deaf, thus illustrating the law of heredity that the offspring tend to revert to the normal type.

In a large number of marriages of deaf-mutes both of the partners are deaf, this probably being due to a feeling of fellowship among those so afflicted, the segregation of deaf-mutes in schools, etc. An interesting observation which appears to be shown in these tables is that in marriages in which both partners are deaf the percentage of deaf offspring is smaller than in marriages in which only one of the partners is deaf. Attention has already been called to this fact by former investigators without, however, arriving at any satisfactory explanation. Darwin, for instance, in commenting upon Sedgwick's suggestion on this subject, states that "in the present state of our knowledge it is better to look on the whole case as simply unintelligible." Fay,[60] however, in explanation, very properly calls attention to the fact that the marriage of congenitally deaf persons is not necessarily a union of like with like from a physiological stand-point.

In a large number of cases of deaf-mutes, however, it is not improbable that a considerable percentage suffer from similar lesions, and we would therefore expect a larger number of deaf offspring from the marriages of deaf-mutes than where only one parent is so affected. This, moreover, has been found to be the case by a number of other investigators, and in 724 marriages collated in the *Münchener medicinische Wochenschrift*[61] only 1.3 per cent. of the 1550 children were deaf and dumb, while in 104 marriages in which both parents were deaf-mutes the percentage was 4.6. In a series of investigations by Mygge[62] it is shown that in cases in which only one parent was a deaf-mute 6.8 per cent. of the offspring were deaf-mutes, while in cases in which both parents were deaf-mutes the percentage was 13.3, or almost twice as high.

As has been already stated, deafness is not a disease but simply a symptom which may be due to many different and unconnected pathological conditions. One person may be deaf from an abnormality of the auditory nerve and another from some defective development of the cochlea, and the marriage of these two does not necessarily increase the tendency in the offspring to the same degree as if they both suffered from similar defects.

The influence of heredity in these cases is considered so strong by Bell that he believes there will be an evolution of a distinct race of deaf-mutes. The majority of investigators, however, do not agree with this view. Quite the reverse of this is the report of Mathison[63], who examined 661 mute children in the Ontario Institute for the Deaf and Dumb at Belleville. He states that he is acquainted with the parents of about three hundred of the children, and has made inquiries during the last five years of many of the others. Up to that time he was unable to find that any of the parents were or are deaf and dumb, although a few of the grandparents were mutes. He therefore believes that the instances of hereditary deafness are few in proportion to the number of deaf and dumb persons.

On the other hand, Urbantschitsch[28] believes that heredity is an important factor in congenital deafness, and that its influence, even if not shown in the direct descent, may be transmitted potentially to a third or later generation. The statistics of the Pennsylvania Institute for the Deaf and Dumb,[64] covering a period of ten years, have been investigated by a special committee, and show that 240 families had during this time sent children to this institute. In six of these families the parents were deaf, in five congenitally so; and the total number of deaf children sent by deaf parents was ten, four of these being deaf from accident or disease. In the cases of the graduates of this institute twenty couples have married, sixteen of whom were known to be congenitally deaf. At the time of this report twenty children had been born to these couples, two of the children being deaf. While this number is comparatively small, it shows that deaf-mutism appeared in 10 per cent. of the children of these marriages, whereas the average proportion of deaf-mute children born of parents not so affected is not more than one to 1500.

The tables furnished by Fay[60] appear to show that the proportion of deaf offspring is less when both partners are adventitiously deaf than when one is so and the other a hearing person. The percentage of marriages resulting in deaf offspring, and the percentage of deaf children born therefrom, is almost invariably the highest when both parents had deaf relatives, next when one had deaf relatives, and least when neither had deaf relatives. This is in conformity with the view of Bell, who maintains that "an hereditary tendency, as indicated by the possession of deaf relatives, is the most important element in determining the production of deaf offspring," and that "it may even be a more important element than the mere fact of congenital deafness in one or both of the parents."

Fay even goes further, and states that while congenital deafness may be considered as a *prima facie* indication of the liability to deaf offspring, it should not be accepted as conclusive indication of such liability, for where congenital deafness is unattended by the possession of deaf relatives the liability, if it exists at all, is very slight and should not be regarded as a bar to marriage. He maintains that persons having deaf relatives are as liable to have deaf offspring as deaf persons having deaf relatives, supposing each to marry deaf partners who have, or each to marry deaf partners who have not deaf relatives.

This view, however, cannot be accepted without reserve, as the actual existence of deafness, in addition to having deaf relatives, must indicate a stronger predisposition in the individual and a greater probability of transmitting it to his or her offspring than the mere existence of deaf relatives. It must be admitted, on the other hand, that deaf-mutism is not hereditary in the ordinary sense of the term, but only in the widest sense in which we apply it in consequence of several members of the same family, their cousins or other collateral branches, being similarly affected. The disease in the offspring is the expression of some unrecognized but abnormal condition of one or both of the parents, and the existence of deafness in several members of the family must therefore be considered a strong predisposing factor in the development of this condition.

It has been maintained by some authors, such as Mygge,[62] that deaf-mutism is more frequently transmitted by the father than the mother, but this is not in conformity with statistics obtained from other sources, and the reverse is the case in the tables of H. Schmaltz.[12] Attention has been called to a curious fact that in some cases only the male,[65] and in others only the female[66] members of the family were deaf. Wilde[7] reports a number of cases in which every second or third child was deaf.

The importance of consanguineous marriages in deaf-mutism has been differently estimated by authors who have investigated this subject. Boudin[67] believes that 25 per cent. of the cases of deaf-mutism are due to this cause, while Hartmann[68] places it at 8.1 and Mitchell[69] at 6 per cent. Attention was first called to the importance of consanguineous marriages by Ménière[70] and Puybonnieux,[71] and while their claims have not been fully substantiated by subsequent writers, the majority of these believe that consanguineous marriages furnish a decided predisposing element in congenital deafness. The statistics collected by Wilde[7] demonstrate this, and the report of the Pennsylvania Institute for the Deaf and Dumb[64] shows, among 546 pupils, 31 instances of blood relations in the parents. Among 336 cases examined by Hartmann,[72] 7 per cent. were of consanguineous marriages; but Schmaltz[12], in the statistics collected from Saxony, estimates a much greater proportion.

The frequent occurrence of all forms of nervous diseases among children of consanguineous marriages is well recognized, and deaf-mutism is sometimes one of these manifestations. This has been shown in a most interesting manner by Loubrieu[73] and Patterson,[74] the latter maintaining that when marriages of near relatives are not followed by deafness in the immediate offspring the result is, nevertheless, a tendency to deterioration of the constitution of the offspring, so that deafness may appear in a successive generation.

In regard to the influence of consanguineous marriages of the deaf, Bell[1] believes that a person with acquired deafness who has no deaf relatives will probably not increase his liability to have deaf offspring by marrying a blood relative. This opinion, however, is open to serious discussion, as acquired deafness, in the majority of cases, indicates a lack of resistance of the organs of hearing of the individual so affected which would probably be aggravated by a marriage with a blood relative in whom the same condition may be potentially present. He is undoubtedly correct, however, when he states that a person congenitally deaf, even without deaf relatives, will probably increase his liability to have deaf offspring by marrying a blood relative, and that where there are deaf relatives a consanguineous marriage will increase the liability to deaf offspring, especially if the relative should happen to be on the deaf side of the family.

The influence of consanguineous marriages does not only tend to increase the number of deaf offspring, but the tables of Fay[60] show that the number of deaf offspring resulting from such marriages is nearly six times as great as in marriages of persons not so affected.

All statistics agree in showing that the number of cases of deaf-mutism resulting from the marriages of deaf-mutes who are not blood relatives is not excessively large, but they also prove that where there are consanguineous marriages this tendency to deaf offspring is decidedly aggravated. Even where no hereditary taint can be traced the marriage of blood relations is sometimes followed by deaf-mute offspring, and in the majority of cases in which the cause is not disease or heredity, this has been found to be the cause. In localities where intermarriage is of frequent occurrence the proportion of deaf-mutes is far above the average. In Alia, Italy, where intermarriage is of common occurrence, the number of cases of deaf-mutes, as well as of idiocy, epilepsy and other nervous affections, is abnormally high. In France, where 2 per cent. of the marriages are of blood relatives,[75] 28 per cent. of the cases of deaf and dumb at Paris, 25 per cent. at Lyons, and 30 per cent. at Bordeaux are the direct issue of such marriages. In Prussia, where the proportion of consanguineous marriages is 0.8,[76] there were 156 cases, or 12.9 per cent., among 1210 deaf-mutes who were the offspring of consanguineous marriages; while among 1551 cases of acquired deafness there were only 47, or 3 per cent., who were the result of such marriages. Of the deaf-mutes at Vienna,[77] 25 per cent. were the issue of blood relations. These statistics show that consanguineous marriages have a marked influence on the propagation of deaf-mute offspring not only where the parents are deaf-mutes or have a tendency to deaf-mutism, but even in cases where there appears to be no such hereditary predisposition.

In cases in which deaf-mutism cannot be traced to heredity or to consanguineous marriages, it may be the expression of an abnormal constitutional condition in the parent. It is a phase of physical degeneration which may appear in families suffering from scrofula, tuberculosis, mental or nervous diseases, syphilis or alcoholism. Social environment is also of importance in this connection, as has been advocated by Ménière.[70] Schmaltz shows the association of epilepsy, idiocy, insanity and other mental manifestations of nervous diseases in the families of deaf-mutes. Several cases of albinismus associated with deaf-mutism have been reported by Dahl,[78] though his observations appear to be unique in this direction. Cretinism is not infrequently met with in the deaf-mute, and Huth[79] has shown that a large proportion of deaf-mutes are found in regions where goitre is prevalent. In some of the cantons of Switzerland the proportion of the deaf and dumb to the population is as high as one in 206, which is almost eight times the general average, as shown by the statistics already given.

The association of ear disease in the families of deaf-mutes has not been found to be very large, according to the majority of investigators, Wilhelmi,[80], Falk,[81] Moos,[82] Schmaltz,[12] and Mygind[83] placing the average at a very low figure. Schwartze,[84] however, believes the opposite to be the case. No doubt ear diseases among the families of deaf-mutes is much more prevalent than would be inferred from the reports of the various institutes for the deaf and dumb, as most of their information regarding this subject has been obtained from the friends of the deaf-mutes, who would not be likely to report mild cases of ear disease unless attended by a considerable degree of deafness.

As far as influence of sex is concerned, boys appear to be more frequently affected than girls, the proportion of male to female, according to Wilde, being 100 to 74.5; Hartmann, 100 to 85.1; Schmaltz, 100 to 85.6. Large families have been considered a predisposing factor by Lemcke,[85] especially when the children are born in rapid succession. The age and difference of ages of the parents have been considered in the investigation of this subject by Ménière,[70] who was the first to call attention to this point. He claimed that the parents of deaf-mutes were frequently very young, and that the father was oftener younger than the mother. These statements, however, have not been accepted by subsequent observers, and Puybonnieux[71] found 70 per cent. of the parents of deaf-mutes to be over thirty years of age.

As a preventive measure against the increase of deaf-mutism, deaf-mutes should be separated as much as possible one from the other, as this association encourages marriage, by which the tendency to deaf-mutism is increased. As the oral method is now more generally taught, deaf-mutes who have acquired this are no longer limited to signs, which practically cuts them off from society. As these are no longer isolated as formerly, the inducement to marry partners similarly affected is not therefore as great as was formerly the case. It has been shown by Fay,[60] however, that, other things being equal, there is a greater possibility of happiness in marriages of the deaf in which both partners are so affected.

The marriages of deaf-mutes between whom blood relation exists, even to a distant degree, should be strongly interdicted, as the possibility of deaf offspring is exceedingly great. The ordinary dangers of consanguineous marriages are aggravated in cases in which there is deafness on one side, as statistics show a tendency to deaf offspring in these cases. Although the majority of writers appear to consider acquired deafness a much lesser evil than congenital in the transmission of deafness, it undoubtedly shows a predisposition toward deafness, so that it differs from the latter only in degree.

Much has been done to ameliorate the condition of the deaf and dumb, and institutes have been established in all civilized countries to educate them in becoming useful members of society. The opportunities offered by the teaching of the oral method and lip-reading more recently introduced has greatly improved the advantages of those so affected, and while speech in these cases is rarely developed to a very high degree, still it enables them to take a more prominent part in the world in general. The training of deaf-mutes, however, is long and tedious, not only for the teachers, but also for the pupils, and education in these cases is much more expensive than the ordinary methods. Even under the very best conditions, deaf-mutes are hampered in their relation to the world. The subject should therefore be well understood, and the tendency to increase this evil by the intermarriage of deaf-mutes and by consanguineous marriages, whether the partners are affected with deafness or otherwise, should be discouraged as much as possible, in order to minimize the propagation of this evil.

BIBLIOGRAPHY.

1. Bell, Alexander G. Marriages of the Deaf in America, Fay, 1898.
2. De Ponce, Pedro. Lehrbuch der Ohrenheilkunde, Urbantschitsch, 1890.
3. Itard. Traité des Mal. de l'Or. et de l'Audition. Paris, 1821, vol. ii.
4. Ménière. Recherches sur l'Origine de la Surdité. Gaz. med. de Paris, 1846.
5. Schmalz, E. Ueber die Taubstummen u. ihre Bildung, etc. Leipzig, 1848.
6. Wilhelmi. Archiv. f. Psychiatrie u. Nervenkrank., 1872, vol. iii.
7. Wilde. Practical Observations on Aural Surgery and the Nature and Treatment of Diseases of the Ear. London, 1853.
8. Meissner, Friedr. Ludw. Taubstummheit u. Taubstummenbildung. Leipzig, 1856.
9. Toynbee. Diseases of the Ear, their Nature, Diagnosis, and Treatment. London, 1860.
10. Hartmann. Taubstummheit u. Taubstummenbildung. Stuttgart, 1880.
11. Hedinger. Die Taubstumm. u. die Taubst. Anstalt nach seinen eigenen Untersuch. in den Institut. d. Koenig. Würtemberg u. d. Grossherzog. Baden, 1882.
12. Schmaltz, H. Die Taubstumm. im Koenig. Sachsen, etc Leipzig, 1884.
13. Field. Diseases of the Ear, 1893.
14. Lemcke. Monats. f. Ohrenheilkunde, 1893.
15. Roosa, St. John. Treatise on Diseases of the Ear, 1891.
16. Mygind, Holger. Lehrbuch der Ohrenheilkunde, Politzer, 1893.
17. Politzer. Lehrbuch der Ohrenheilkunde, 1893.
18. Lent. Statistik der Taubstummen des Regierungsbez. Koeln, etc., 1870.
19. Wilhelmi. Statistik d. Taubstummen d. Regierungsbez. Magdeburg's nach d. Volkszähl, 1891.
20. Urbantschitsch. Ueber Hoerübungen, etc. Wien, 1884.
21. Uchermann. Taubstummheit. Berlin, 1894.
22. Lemcke. Taubstummheit. Berlin, 1894.
23. Bezold. Ueber die funktionelle Prüfung des menschlichen Gehörorgans. Wiesbaden, 1897.
24. Wilde. Lehrbuch der Ohrenheilkunde, Urbantschitsch, 1890.
25. Meyer. Virch. Arch., 14.
26. Waldschmidt. Zeit. f. Psych., 43.
27. Mygind. Arch. f. Ohren., 30.
28. Urbantschitsch. Lehrbuch der Ohrenheilkunde, 1890.
29. Hedinger. Die Taubstummen. u. Taubstummenanstalten in Würtemberg u. Baden. Stuttgart, 1882.
30. Lemcke. Zeit. f. Ohrenheilkunde, xvi. 28.
31. Schmaltz. Lehrbuch der Ohrenheilkunde, Burkner, 1892.
32. Moos. Treatise on Diseases of the Ear, St. John Roosa, 1891.
33. Bliss, A. Medical News, August 10, 1895.
34. Hartmann. Lehrbuch der Ohrenheilkunde, Politzer, 1893.
35. Étude sur les Causes de la Surd-mutité, Coll. des Thêse, 1863, vol. viii., No. 153. Paris.
36. Boudin. Annals de Hygiene, 1853, vol, iv.
37. Encyclopædia Britannica. Article, Deaf and Dumb, 9th ed.
38. Mayr, George. Die Verbreitung der Blindheit, der Taubstummheit, des Bloedsinns u. des Irrsinns in Bayern. Einer allgemeinen int. Statistik dieser vier Gebrechen München, 1877.
39. Schwartze. Handbuch der Ohrenheilkunde, 1893.
40. Die Bevölkerung der im Reichsrathe vertretenen Koenig., etc. Wien, 1882.
41. Ergebnisse der in den Ländern der Ungarischen Krone am Anfange des Jahr., 1881, vollz. Volkszähl. I. Budapest, 1883.

42. Bidragtil Sveriges officielle Statistik. A. Befolkningsstastik f. Aaret, 1888. Stockholm, 1885.

43. Guttstadt. Die Verbreit d. Blinden u. Taubstumnen nach. d. Volkszähl v. 1, Dec., 1880, etc., in Preussen. Zeit. d. k. preuss. statist. Bureaus. Berlin, 1883.

44. Bidragtil Finlands officielle Statistik. VI. Befolkningsstatistik, Nr. 11, Finlands Folkemaengde d. Dec. 31, 1880. Helsingfors, 1885.

45. Urchermann. Doevstumhed, isaer i Norge. Norsk Magazin for Laegevidenskaben. Christiania, 1890.

46. Census of Ireland, 1881, Part II., General Report. Dublin, 1882.

47. Estatitica de Portugal Popelaçao, Census No. I., Jan. 1878. Lisbon, 1881.

48. Statistica Sugli instituti dei Sordo-muti e. de Ciechi; Annall di Statistica. Rome, 1887.

49. Mygind. Die Taubutummen in Dänermark, etc., Zeit. f. Ohrenheilkunde, 1892.

50. Statistics de la France. Résultats généreux du denombrement de 1876. Paris, 1878.

51. Ninth Centennial Census of Population of Scotland, April 4, 1881. Edinburgh, 1883.

52. Censimento della popolazione del regne d'Italia al 31 Dec., 1881. Rome, 1885.

53. Census of England and Wales, 1881, Parliamentary Reports, vol. lxxx. London, 1883.

54. Censo de la Poplazióne de España, seqûn el empadronamento hecho en 31 Dec., 1877. Madrid, 1884, vol. iii.

55. Report on the Defective, Dependent, and Delinquent Classes of the Population of the United States as returned at the Tenth Census (June 1, 1880). Washington, D. C., 1888.

56. Egger. Révue Hebdomadaire de Laryngologie, etc., Feb. 18, 1899.

57. Ménière. Gaz. de Paris, 1856; S. Schmidt's J., 91.

58. Mitchell. Ann. de Mal. de l'Or., 1876.

59. Mitchell. Med. Times and Gazette, August 15, 1863.

60. Fay, E. Allen. Marriages of the Deaf in America, 1898.

61. Journal of Laryngology, Rhinology, and Otology, 1898.

62. Mygge. Om Aegteskaber mellem Blodbeslaegtde med. specialt Heusyn til deres Betydning, Doevestumhedens Aeteologi. Kjobenhavn, 1879.

63. Mathison, R. Diseases of the Ear, Turnbull, 1887.

64. Turnbull. Diseases of the Ear, 1887.

65. Kramer. Ohrenheilkunde, 1836.

66. Sedgwick. S. Schmidt's J., 1863.

67. Boudin. Lehrbuch der Ohrenheilkunde, Politzer, 1893.

68. Hartmann. Ueber Taubstummheit im Koenigreich Sachsen, 1884.

69. Mitchell. Lehrbuch der Ohrenheilkunde, Politzer, 1893.

70. Ménière. Gazette Méd. de Paris, 1846.

71. Puybonnieux. Mutisme et surdité, ou influence de la surdité native sur les faculte physiques, intellectuales et morales, Paris, 1846.

72. Hartmann. Lehrbuch der Ohrenheilkunde, Bürkner, 1892.

73. Loubrieu. Étude sur les Causes de la Surd-mutité, Coll. des Thèses, 1868, vol. viii.

74. Patterson. Journal of the Statistical Society, vol. xxxviii.

75. Boudin. Diseases of the Ear, Field, 1893.

76. Hartmann. Archiv f. Otologie, December, 1880.

77. Singer. Diseases of the Ear, Field, 1893.

78. Dahl. Bitragtil Kundskab om de Sindssyge i Norge. Christiania, 1859.

79. Huth. The Marriages of Near Kin, 1875.

80. Wilhelmi. Beiträge zur Pathol. u. Anat. Ohres. Archiv f. Ohrenheilkunde, v.

81. Falk. Statistiks d. Taubstummen d. Regierungsbez. Magdeburg's nach der Volkszähl., 1871.

82. Moos. "Aetiologie u. Befunds von 40 Fällen angeborener Taubst." Z. F. O., XI., 1882.

83. Mygind. Die Angeborene Taubstummheit, etc. Berlin, 1890.

84. Schwartze. Handbuch der Ohrenheilkunde, 1892.

85. Lemcke. Monatsschr. f. Ohrenheilkunde, 1893.

REVIEWS.

La Suture Intestinale. Histoire des différents précedes d'enterorraphie. Par Félix Terrier, Professeur de Médecine Opératoire a la faculté de médecine, et Marcel Baudouin ,Préparateur du cours de médecine opératoire a la faculté. Paris : Institut de Bibliographie Scientifique.
Suture of the Intestine. History of the Different Methods of Enterorrhaphy.

The book before us is of extreme interest to all who operate within the abdomen and to all who care for the history of surgical effort. It is intended to be a book of reference, and in it is given the history of the numerous operations for suturing the intestines, the operations being arranged according to the dates of introduction. The work contains over 400 pages, and is illustrated by 587 cuts, most of which are excellent. The indices are admirable, a merit which is not common in French books and which is extremely uncommon in the treatises of our German confrères. The authors have succeeded in producing a most valuable book, a book which is a complete study of intestinal sutures, their origins, their uses, their faults, and the details of their application.

Surely, in no department of human effort, has more energy, patience, and ingenuity been displayed than in the devising of intestinal sutures. To this subject many of the greatest masters of surgery have devoted their best talents, but they have not been alone in invention. Eccentrics with grotesque ideas; whimsical geniuses with fanciful notions; those whose only thought was to benefit man ; those whose chief hope was to benefit themselves; seekers of fame; hunters of notoriety; searchers for gold ; mechanicians who regarded tissues as so much wood or tin, and forgot that they were living and possessed of antipathies, weaknesses, and powers of reaction, have all had a try. From such heterogeneous influences have come scores of sutures, a few clear-cut principles, some very useful procedures, but not as yet the ideal method. Many of the methods described in this book are, of course, useless and obsolete, and to read of them is to feel like Huckleberry Finn when he read the *Pilgrim's Progress* and said the " facts " were " interesting but tough." It is curious to note how often a single method may die and be rediscovered. The use of collapsible rubber bags or cylinders to support the intestine during suturing has been discovered six times. Some methods crop up over and over again, being disinterred by some enthusiast almost as soon as the funeral obsequies are over. Treves recently commented on this curious fact. The temptation is strong to apply to some of these " busy idlers," as Michael Foster might call them, the words used by Rica in Montesquieu's *Persian Tales :* " If a man has nothing new to say why can't he be quiet. Why should we be troubled with these useless repetitions." The book of Terrier and Baudouin will render such rediscoveries less justifiable than was formerly the case.

The authors in considering the evolution of enterorrhaphy make fourteen periods, beginning with the Hindoos. The suture was suggested in the Indian Vedas. In these remarkable collections it was said that in a wound of the intestine a large beetle should be laid upon the wound in such a manner that its mandibles would fix upon the edges and close the wound. The body should then be twisted from the head. The Arabian surgeons also used "ces véritable serre-fines de nature animale." Albucasis describes the method, and, according to Terrier and Baudouin, certain beetles are still used for this purpose among the natives of Algeria. Celsus mentions suture of the large gut, but does not explain how to do it. Galen sutured the large gut. Roger, of Parma, first used artificial supports. He was professor of surgery in Salerno about 1265, and sutured the gut over a "canula" of elder wood. This plan of Roger has led to the employment of numerous other substances as artificial supports: the calf trachea of the Four Masters; dried intestine; the tallow candle of Scarpa; the gelatin tube of Watson; the varnished cord of Sabatier and Chopart; the bone plates of Senn; the bone bobbin of Mayo Robson; the potato plates of Dawbarn; the catgut rings of Abbe; the metal button of Murphy, etc.

The Four Masters lived in Paris at the end of the thirteenth century. But little is known of them. It is believed that they were four charitable men, who were drawn together by a common purpose, who lived together, and who practised only among the poor. It has usually been said that their names are unknown. Terrier and Baudouin say that their names were Archimateus, Petrosellus, Platearius, and Ferrarius. The Four Masters thought that the effort should be to bring the cut surfaces into direct contact, and in order to do this they sutured the gut over the trachea of an animal placed within. We find that the method of the Four Masters was revived and successfully applied by Duverger, of Maubeuge, in 1745. In the eighteenth century William of Salicet advised the use of the glover's suture for oblique and longitudinal wounds. The picture given of the glover's suture (Fig. 5) is the one usually given. As a matter of fact, two stitches are frequently confounded. The cut shows the ordinary continuous or seamstress stitch, which will invert the edges. The glover's or herring-bone suture will not invert the edges, and it is not probable that William of Salicet inverted the edges. Palfyn introduced a method which was long very popular. He was born in Ghent, and was a teacher of surgery in Flanders early in the eighteenth century. He believed that it was useless to sew up the bowel, as it would not unite, and suggested that the proper plan was to try to obtain adhesion to adjacent parts. Poland says he advised that a single thread be passed through each edge of the wound in the bowel, that the ends be gathered together and brought out of the abdomen, and after the bowel had been drawn close to the abdominal wall the threads be fastened to the skin by plaster.

Mr. Poland has insisted that Palfyn did not stitch the bowel to the belly wall (see Ashhurst's *International Encyclopædia of Surgery*). Terrier and Baudouin disagree with Poland, and claim that he stitched the cut bowel to the belly wall. La Peyronie modified Palfyn's method so as to apply it to complete transverse divisions. He passed the thread through the mesentery and pulled the bowel against the parietal peritoneum. John Bell advocated Palfyn's method and opposed sutures. In his discourse on wounds he claimed that suturing as advocated by

Benjamin Bell must cause gangrene. Ledran (1768) advocated treating a wound of the intestine by the passage of a number of interrupted sutures, gathering the ends together, twisting them into a cord, and bringing the cord out of the wound. The suture of Ledran applies the same principle as the suture of Palfyn. Sir Astley Cooper claimed that a small wound should be treated by pinching up the opening and fastening a thread around it. Travers used this method, but advocated suturing for large wounds, and thought that the ends of the ligature should be cut off. These old methods were occasionally, though rarely, successful. In 1822, Jobert suggested a new method for treating complete division. He dissected the mesentery from each end for a short distance, inverted the edges of the larger portion, inserted the smaller portion into it, and fastened it with sutures which entered into the lumen of the bowel. He first brought out the ends as did Ledran, but gave this up in favor of interrupted sutures. He laid down the principle that peritoneum should be brought into contact with peritoneum. Lembert, in 1826, devised the famous stitch which goes by his name, and which effects invagination of the serous surfaces, but does not enter into the lumen of the bowel, a stitch which is constantly used to-day, but in applying which we remember the advice of Halsted, and catch up the tough submucous coat. In spite of centuries of study and experience, or possibly because of unfortunate experience, at the time of our Civil War most surgeons treated intestinal wounds simply by the " do-nothing " system of giving opium. They stood by with folded hands and let the patient die. Guthrie opposed inaction, Gross advocated interference; but Gross and Guthrie were in a small minority. The great discovery of Lord Lister altered all our views and revolutionized all our methods. Surgeons awoke to the real facts and to the great possibilities of the future. Inaction has given way to radical interference and many cases are saved. America has had her full part in this advance, and the authors of this book do ample justice to Abbe, Brokaw, Ashton, Bodine, Downes, Laplace, J. Shelton Horsley, Briggs, McGraw, Dawbarn, Cushing, Matas, Mudd, and Weir, the magnificent achievements of Nicholas Senn and the noteworthy and valuable studies of Halsted and of Murphy. We do not think that the authors have fully appreciated the mine of information contained in *The Medical and Surgical History of the War of the Rebellion.* They have not mentioned the essay of T. Smith, of St. Croix, an essay which did much to discredit the suture of Palfyn, so strongly advocated by John Bell. Smith experimented on dogs, and found that operations performed as Bell advised were invariably followed by fecal extravasation and death. It is very difficult to see how the authors of this otherwise complete treatise have overlooked the work of the elder Gross. He studied this subject all his life. He made many experiments. He wrote several papers upon it. His first contribution to surgical literature was on enterorrhaphy. In this he reported fourteen operations on dogs, only one of which was fatal. His last paper, written over fifty years later, was on the same subject. For years he was one of the few who insisted that a wound of the intestine should in every case be sutured by an inversion stitch. He was a pioneer, and his great work should be set forth at length.

In closing this interesting and valuable book, we can say that Eng-

lish and American surgeons may well be proud of the part played by their countrymen in this attractive and important department of surgery.
J. C. Da C.

The Rise and Development of the Liquefaction of Gases. By Willett L. Hardin, Ph.D., Harrison Senior Fellow in Chemistry in the University of Pennsylvania. New York: Macmillan Company, 1899.

A great deal of popular interest has been excited by the recent scientific studies regarding the liquefaction of gases, and the subject has become one of immense promise in practical directions, since means have been devised for producing in liquid form gases of various sorts, and particularly for making liquid air upon a commercial scale. The advances is this branch of practical physics have followed each other with almost startling rapidity, so that it is scarcely possible as yet to form an opinion as to the ultimate uses to which liquefied gases may be devoted. The latter matter is one of intense interest to the medical profession, on account of the possibilities in various medical directions as well as from the fact that prominent characters in the history of medicine have also been associated with the history of this branch of physics. The well-known name of van Helmont is met with as one of the first to suggest the possibility of gaseous substances becoming liquefied, and it was he who first discovered the proper distinctions between gases and vapors. The more recent history of the subject, of course, embraces the names of physicists only.

Among the uses that have been suggested for liquefied air are certain adaptations to ventilation, and condensed air has been used sometimes to great advantage in various building operations, notably in caissons and tunnels. The possibility of very largely increasing this advantage by the use of liquefied air naturally suggested itself when this substance was found to be producible on a large scale. Thus far, however, this use of the liquid has not been actually carried out, and the suggestion remains as merely one of probable usefulness. Another possibility connected with ventilation is that of using the liquefied air for the purpose of cooling the atmosphere of sick-rooms or dwelling-rooms. There is, of course, the absorption of a very large quantity of heat in the expansion of a comparatively small amount of liquefied air; and if some means can be devised by which the substance can be properly conveyed, and can be exposed for evaporation, there is little doubt that an appreciable cooling influence will be exerted at the same time that a supply of pure air is furnished to the room in which the liquid is exposed. Unfortunately, up to the present time no useful method of practically carrying out this possible application of liquefied air has been devised, but there can be little doubt that the means will be found when the handling and transportation of the substance are somewhat more thoroughly understood.

A possible use that is of particular interest to physicians is that connected with disinfection, and the author refers to the experiments of Cohn, Melsens, Pictet and Yung, Coleman and McKendrick, and Pictet, all of whom have studied the effect of extreme cold or of liquefied gaseous substances upon various forms of animal life. The results of these investigations, however, do not give ground for much hope that liquefied air will serve a definite purpose as a disinfectant or germicide. Curiously enough, the author, though connected with the University of Pennsylvania, does not refer to the experiments conducted in the same university by Dr. Ravenel.[1] The latter investigator found that the spores of anthrax bacilli and other organisms, either in spore form or in the mature condition, resisted the action of the extreme cold of liquefied air beyond expectation. These experiments, however, consisted merely in the exposure of organisms in bulk to the direct action of the liquefied air in its liquid form. It is not impossible that the liquefied air may be indirectly useful by furnishing any places in which rapid oxidation is desirable with a large quantity of oxygen in a condensed form—in other words, it is probable that thorough "airing" may be secured for packages or for solid substances as well as infected liquid masses, such as cannot be fully exposed over a large surface. Investigations in this direction have not as yet been made.

The little book under review is presented in an interesting and popular form, and will be useful as a reference book for readers who have not a large knowledge of physics. A. S.

MATERIA MEDICA, THERAPEUTICS, MEDICAL PHARMACY, PRESCRIPTION WRITING, AND MEDICAL LATIN. BY WILLIAM SCHLEIF, Ph.G., M.D. Philadelphia and New York: Lea Brothers & Co., 1899.

SMALL books on therapeutics and materia medica are exceedingly important for the student and for the general practitioner. The rapid increase in the number of medicinal preparations, most of them of synthetic nature, requires a constant repetition of new editions, and small works have, therefore, some advantage over the larger and perhaps more scientific ones. The book under review is written by one who has had experience in the teaching of pharmacy as well as therapeutics, and his presentation of the subject is correspondingly satisfactory. The book does not pretend to enter largely into the scientific aspect of therapeutics, but in a practical way offers the information usually sought for by students and physicians in books of this sort. The chapters on Prescription Writing, Antidotes, Incompatibilities, etc., are very useful for the student, and the chapter on Dietetics is useful, though it is difficult to treat such a subject adequately in the limited space here assigned. The author classifies drugs in various groups somewhat after the manner of H. C. Wood. While this method has not been generally followed in similar books in recent years, and though there are some quite proper objections to such a classification, it has advantages in the way of bringing under the student's notice drugs having a similar action in a way that could not be accomplished were the alphabetical arrangement of remedies followed. We should have been pleased to find some mention at least of some of the newer preparations which have not as yet received the official sanction of the profession, but which are used very largely by physicians. A. S.

---

[1] Medical News, June 10, 1899.

TRANSACTIONS OF THE AMERICAN MICROSCOPICAL SOCIETY. May, 1899, vol. xx.

MUCH of the advance in science, especially in its details, has undoubtedly been due to the formation of particular societies for the propagation of its categorical parts. Meetings with discussions of questions demonstrate how little even the oldest and wisest know, and encourage original work and further researches in the literature. Moreover, nothing raises the standard of such societies so much as the publication of their proceedings. Many things men utter as facts which they would hesitate to put over their names in print, very probably on the principle of the old tent-maker:

> The Moving Finger writes; and having writ
> Moves on: nor all your Piety nor Wit
> Shall lure it back to cancel half a Line
> Nor all your Tears wash out one Word of it.

We are, consequently, always glad to notice the publication of such volumes as the *Transactions of the American Microscopical Society.* In this the twentieth volume there are several subjects distinctly medical in character, and, though not startling in their originality, we wish to mention some of them. The article by Archibald Ward, on "The Persistence of Bacteria in the Milk-ducts of the Cow's Udder," is of much interest to the bacteriologist. His conclusions affirm that bacteria invade not only the teats, but ascend to the ramifications of the ducts in the udders, and remain there in an active state. Dr. Frank Parker, in his "Micrometry of the Red Blood-corpuscle," seems to draw an unwarranted, hasty conclusion. He informs us that Gram states the red corpuscles of the Northern races to be larger than those of the Southern, from measurements made on Norwegians, Germans, and Italians, which he (Parker) denies, from measurements on five persons —two from the United States, one from Italy, one from Finland, and an Esquimaux, though the diameter of the Esquimaux's was the largest. It is difficult to understand the drift of Dr. Young's article on "Medical Microscopy." It contains nothing new, and its suggestions are unintelligible or false. Some of the articles on other subjects are of a very high standard, among which may be mentioned particularly Frederic Clements' "Contributions to the Histogenesis of the Caryophyllales" and Wolcott's article "On the North American Species of the Genus Atax." J. W.

THE INTERNATIONAL MEDICAL ANNUAL AND PRACTITIONERS' INDEX. A Work of Reference for Medical Practitioners. Seventeenth year. New York: E. B. Treat & Co., 1899.

CERTAINLY the medical profession should be widely if not well read. The facilities that are offered by various ingenuous and enterprising publishers for acquiring a maximum knowledge of medical literature with a minimum of effort ought to enable every man to know all that is going on in his profession. The present book is put together according to a definite and a not illy conceived plan. It contains a number of good special articles, particularly the one on practical X-ray work by Morris Wolfenden. The medical articles are arranged alphabetically according to the disease. Some of them are based upon a single abstract; others upon a number of papers that have appeared in different journals; the latter acquiring by their collective and comparative character an element of authority and independence that is usually lacking in such publications. Some very fair plates of pathogenic bacteria are inserted in the back of the book, and a series of notes on American "Legal Decisions," by W. A. Purrington, is, in our opinion, one of the most valuable features of the book. Altogether, for the purpose of reference to the literature of the past two years, the book is exceedingly handy and valuable. As this is an annual, it seems to us that it would be more desirable to limit the range of time during which articles that are used for abstracts may appear rather more narrowly than has been done. References to literature as far back as 1896 are by no means uncommon, and might as well have been included in an earlier edition of the book. J. S.

A TEXT-BOOK OF MENTAL DISEASES. By BEVAN LEWIS, L.R.C.P. (Lond.), M.R.C.S. (Eng.). Second edition. Philadelphia: P. Blakiston's Son & Co.

OF late years we have come to expect of a text-book of any pretensions an exposition of the anatomy and physiology of the subject under consideration. In but few text-books of nervous diseases is this necessary portion of the work neglected. The text-book of insanity that takes cognizance of the existence of a nerve-cell, its arrangement in the cortex, its comparative anatomy, or its pathological states is, however, the rare exception. This work is the exception, and such a beginning augurs well for the future in this field.

It has not been so long since we were accustomed to hear it taught dogmatically that intellectual operations were confined exclusively to the frontal lobes. The experiments of Ferrier in removing these areas in the monkey with a loss of the power of attention and interest has not been confirmed in the German laboratories. Flechsig has shown us, in a broader spirit, that the association areas in the parietal lobe are much concerned in these functions. The tendency at present is not to restrict the intellectual processes to any cortical tissue, either cerebral or cerebellar. These lessons, if they teach us anything, teach us that we cannot lay our finger with certainty upon any portion of the brain and locate the reasoning or intellectual faculties. They teach us that we must start anew in our researches with the active cellular elements of the encephalon as a basis to establish the function of each area upon some logical plan. It is, therefore, with much satisfaction that we note in this latest contribution from the pen of that sterling neuropathologist and psychiatrist, Dr. Bevan Lewis, fully one-fourth of the work devoted to the finer anatomy of the brain and one hundred additional pages to the pathology of insanity.

The discussion of the differentiation of the motor from the sensory cortex is treated in the light of comparative anatomy. The results are not positive. Experimental work has taught us that physiological laws applicable to the lower vertebrates do not correspond in man. This differentiation of the cortex noted in the lower animals cannot be clearly defined in the human brain. It is not even definitely settled that the Betz giant-cells of the paracentral lobe are motor. The difference in lamination of the motor and the non-motor cortex is the only positive result obtained from these painstaking investigations.

We find throughout the book the neuron theory accepted and used as a working basis for the anatomical and physiological researches. That the neuron theory, as we formerly understood it, and as it is here presented to us, cannot exist in its entirety is only too evident from the newer facts brought to light by Apáthy, Baker, and Leuhossek, etc. Nor are we to understand that the neuron theory is to be thrown aside in its entirety and forgotten. The anatomical individuality of the nerve element, the unity of the cell, its processes, and the nerve fibre as a nutritional entity will remain as a vital necessity in our discussions of the nervous system and its intimate anatomical relations. There is, therefore, but little objection to the use of the neuron terminology in a work like this, but the student should not be misled, as he is here very apt to be, into believing the neuron theory as accepted fact. That the newer investigations into the cytology of the nerve cell should find no mention in a work otherwise so advanced in its teaching is indeed surprising.

As to the existence of the "scavenger cell," on which the author lays so much stress, and to which he devotes considerable space, there can be no doubt. His theory as to its development and significance will not find so ready an acceptance. The common belief is that it is a reaction of the glia cells to irritative processes, usually inflammatory in type. The author believes it to be a lymph-connective element, different in nature from the glia cell and intimately associated with metabolic changes in the ganglia cell. Its presence in the brain of epileptics and senile dements has long been recognized.

The clinical portion of the work comprises statistics based upon an analysis of 4000 cases of insanity in both sexes treated at the West Riding Asylum. The commonly accepted clinical classification is used, and a thorough psychical analysis carried out in each class of cases. The chapter on general paralysis of the insane is especially noteworthy.

The book is well written, profusely illustrated, and thoroughly indexed. The plates illustrating the cortex in health and disease we have never seen equalled. The neurologist and psychiatrist will find food for thought in every page of this most excellent work. D. J. McC.

LABORATORY WORK IN BACTERIOLOGY. By F. G. NOVY, SC.D., M.D. Second edition. Ann Arbor: George Wahr, 1899.

ON being asked a few years ago by a young man what he considered the most generally useful discovery to make in medicine, a celebrated French clinician replied: "A method of absolutely diagnosing typhoid fever in its early stage." True, this is a rather rash, spontaneous statement, but it illustrates the importance of diagnosis. When this discovery *was* made it fell in with tuberculosis, influenza, diphtheria, and gonorrhœa under the head of bacteriology.

From the limited aspect of diagnosis, considering only the diseases mentioned, what important proportions bacteriology has assumed! More important than the physical diagnosis of the lungs, which we spend months in studying, and all the bacteriologist asked was six weeks. But his turn is coming at last, as is evident from the appearance of such books as Dr. Novy's. So far we have dealt almost entirely with text-books or manuals, more or less voluminous, arranged according to theoretic divisions; here we have a departure, the arrangement following the lines on which the author has found by actual practice instruction to be the most simple. It does not pretend to be a bacteriological text-book, but a guide to a complete course of laboratory instruction in the best methods and those which the test of time has made the standard. It is compiled for the author's own course of twelve weeks, but is as well adapted for shorter courses. Designed for practical work by a practical teacher, the descriptions are clear and readily intelligible, and experiments to be done with complicated apparatus have been eliminated by illustrations that illustrate. That the work is up to its time is indicated by the fact that it describes in detail the collodium sac method for increasing the virulence of an organism, which we believe has not yet been done by any other American text-book. With such a book on the market, for teachers to make students take down dictation is a direct snub to our much-abused but revengeful old friend—Time.
J. W.

Clinical Lectures on Mental Diseases. By T. S. Clouston, M.D. (Edin.), F.R.C.P.E. Fifth edition. Philadelphia and New York: Lea Brothers & Co.

If, as the author tells us in his preface, the fifth edition of a work on insanity should need no further explanation of its existence, an extended review and criticism of the same would likewise seem superfluous and unnecessary. If, however, with each new edition the advancement made in pathology and treatment are recorded and discussed, the fifth edition of the work must necessarily be a very different book from the first.

In this much-quoted work on psychiatry we have presented to us in twenty lectures an experience of forty years among the insane. A subject like psychiatry in the absence of a psychology based on anatomical principles must necessarily resolve itself into a science of classification. Whether this classification be on a purely clinical or a psychological basis is of but little importance. What is of much more importance is that a nomenclature be employed which the student in general will understand. The system now in vogue by every author of a text-book on insanity of using terms which his students alone will understand and use is responsible for the wide-spread lack of interest among physicians and students for this branch of medicine.

The classification which we meet here, and which plays a very small part in the make-up of the book, has as many strong and weak points as we would expect from a mixed classification. The terminology of the various diseased mental states, psychalgia, psycalampsia, psychoparesis, etc., is based on a false psychology, or at least purely theoretical psycho-pathology, and could hardly be expected to receive general recognition. A psychology based on facts and not pure theory is a *sine qua non* for a classification and nomenclature to which the term scientific can be applied. Until such a rational psychology, shorn of its metaphysics, be established, it would seem to us that a purely clinical classification and nomenclature could do less harm and be of more real value to the student than any other.

The value of a series of clinical lectures in printed form, like the clinical lectures themselves, depends not so much on the classification or terminology as on the character, selection, and arrangement of the cases presented, the manner of presentation, and the personality of the clinician. The lectures before us are eminently practical, the clinician never losing sight of the principle that it is his first duty to cure his patient. He has drawn freely on his long experience in giving us a work which, while up to date in all respects, yet in its principle of treatment has few equals in any language. The book is written in a very readable style, and nineteen plates in color and a complete vocabulary enhance the value of the work. D. J. McC.

PROGRESSIVE MEDICINE. A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS IN THE MEDICAL AND SURGICAL SCIENCES. Edited by HOBART AMORY HARE, M.D. Vol. III. September, 1899. Philadelphia and New York: Lea Brothers & Co.

THE third volume of this most serviceable quarterly is devoted to a review of the contributions made to diseases of the thorax and its viscera, skin, nervous system, and to obstetrics. Dr. William Ewart, of London, has undertaken the section devoted to diseases of the heart, lungs, and bloodvessels. This review of the recent literature of these subjects is one that might properly be expected from his pen—clear, comprehensive, and complete. The pages calling especially for favorable comment are those devoted to pulmonary phthisis and tuberculosis, and to the therapeutics of diseases of the heart.

Diseases of the Skin, divided into disorders of secretions, inflammations, hemorrhages, hypertrophies, atrophies, new growths, parasitic diseases, and neuroses are reviewed by Dr. H. W. Stelwagon. This section is appropriately illustrated by a number of drawings excellently reproduced.

Dr. W. G. Spiller summarizes and presents recent neurological literature in a section of seventy pages. This contribution is particularly valuable, because of the sane comments and critical estimation of many of the articles reviewed.

A very considerable part of Dr. Richard C. Norris' review of the literature of obstetrics is devoted to the surgery of obstetrics and to the puerperium and its complications. *Progressive Medicine* seems to the reviewer to be a trustworthy guide to the medical literature of the immediate time and an adequate presentation of the really important contributions, briefly and understandingly presented. J. C.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,
PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

Chronic Stiffness of the Vertebral Column.—DANA (*Medical News*, November 25, 1899, p. 673) discusses the subject of chronic spondylitis, and reports three personal observations. Ankylosis of the spine, with or without involvement of other points, or with involvement of only the hip and shoulder, is comparatively rare, except as a result of trauma or Pott's disease. It is observed, however, in association with chronic or gonorrhœal rheumatism, in arthritis deformans, spondylitis deformans, or as an occupation kyphosis of certain laboring classes.

Chronic spondylitis has generally been classed with arthritis deformans. In recent years two types of cases of chronic stiffness of the vertebral column have been reported which were believed to possess characteristics differing essentially from those of arthritis deformans with spinal involvement.

Instances of the first type were first published by von Bechterew in 1892, when he reported five cases of "stiffness of the vertebral column with kyphosis as a special disease type." He himself and others have since recorded similar cases. Here the trouble begins in the spine primarily, and is accompanied with a progressive stiffness and arching of the back which may become very marked. The patient suffers a great deal from intercostal pains, and the hip-joints and shoulder-joints are not very much, if at all, involved. According to Marie, there is an hereditary history and frequently a history of trauma, and he calls it the "hereditary traumatic type."

Dana reports two cases which belong to this type. The first case was a man, aged forty-four years, whose present trouble began about three years before he was first seen, which was in June, 1896. He first noticed a gradual stiffness developing in the upper part of his spine, and at the same time the shoulders became stooping and the back more and more arched. This was associated with some pain and a sense of discomfort in the back, and a feeling at times of constriction around the chest. There was never sufficient pain nor any acute illness to cause him to go to bed. The process gradually advanced until the whole vertebral column was perfectly rigid and very much arched, so that he walked with his body inclined at a marked angle. The head also became somewhat immobile, so that he could not move it upward or forward to any great extent, and the lateral movements also became lessened. There was but very little trouble with the hip-joints, and he could walk fairly well. The arms were strong, but the movements of the shoulders became rather limited.

The second case was a man, aged fifty-two years. He gave no history of injury nor of any hereditary taint. His present trouble began about one year before he was first seen, when he began to complain of pain and stiffness in the back. These pains were continuous and squeezing in character, and they ran sometimes down into the arms, especially into the left, but never involved the legs nor the viscera. These pains and the stiffness in the back continued gradually without much intermission. The patient consulted specialists in Europe, where locomotor ataxia was diagnosed. He was treated at Nauheim without relief. He returned to the United States, and was seen by Dana in 1891. At that time the spine was rigid in the cervical and dorsal regions, there being some movement in the lumbar region. The shoulder-joints were somewhat stiff. The spine was very slightly arched forward. There was no stiffness or ankylosis of the joints of the lower extremities, and no rheumatic deformities of any of the joints. The patient complained of an almost continuous feeling of constriction, sometimes amounting to pain, in the region of the fourth and fifth dorsal vertebræ, where there was little tenderness on percussion, but absolutely no kyphosis.

These two cases are believed by Dana to belong to the type of cases described by von Bechterew.

The second type of cases was first referred to by Strümpell, and later described in detail by Marie, who designated the affection by the name of "spondylitis rhizomelia," the term indicating an involvement of the spine-joints and root-joints. The condition as described by Marie is one characterized by a progressive ankylosis involving usually first the hip-joints, then the vertebral column, and the shoulder-joints. Sometimes both of the knees are affected, but never any of the smaller joints. There is no association with rheumatism or gout. The process is a chronic one, and accompanied with a little pain. Some exostoses are observable upon the sacral bones and the bodies of the central vertebræ, and also a flattening of the thorax and pelvis, with loss of thoracic respiration and muscular atrophy in the dorsal and gluteal regions. The smaller joints are unaffected. The disease attacks men only, and occurs at middle life and somewhat later.

Dana gives the notes of an interesting case which he believes belongs to this class.

In the matter of diagnosis one has to differentiate between spondylitis rhizomelia and arthritis deformans involving the vertebral column. According to Dana, the essential points which are claimed to differentiate spondylitis are: 1. The fact that it produces directly an ankylosis, without any previous inflammatory swelling, with exudation and proliferation; also, that it produces this ankylosis directly, and not as a result of a deformity with secondary ankylosis, as in the case of arthritis deformans. 2. That it begins in the vertebral joints and extends thence to the hips and other large joints. 3. That the smaller joints are never or only rarely affected. 4. The internal organs and nervous system remain normal. 5. The clinical picture is one of great uniformity. 6. There is no previous history of rheumatism or gout, and no evidence of arthritis deformans in other parts of the body. 7. The disease occurs usually in men in about middle life.

Dana states that so far as personal observations go it does not appear to him that a special new malady has been made out. He is inclined to believe that, after all, spondylitis rhizomelia is a form of arthritis deformans.

Acute Diabetes Mellitus Supervening in a Case of Diabetes Insipidus; Coma; Death.—BLACKETT observed an interesting case in which diabetes insipidus was followed by diabetes mellitus, the patient dying eventually of diabetic coma. The etiology of the disease was attributed to mental shock and worry.

The patient was a man, aged fifty-four years. There was no family history of diabetes. In 1897 he was overworked in arranging a bazaar. He received a severe shock in May, 1898, a friend with whom he was in conversation suddenly dropping dead at his feet. In September, 1898, he was present at a fire between 2 A.M. and 5 A.M., and worked hard in an endeavor to save life and property. Almost immediately afterward he began to suffer from great thirst, dryness of the mouth, debility, and polyuria. The thirst persisted until February, 1899. The amount of urine varied between seven and eight pints to over ten pints. The specific gravity was always low, ranging between 1006 and 1010 at this time. The urine was repeatedly examined for sugar and albumin and always found negative. During January, 1899, the specific gravity of the urine ranged as low as 1002. Early in February the thirst and dryness of the mouth diminished, and the amount of urine was much less. Throughout March his general health was much improved. On April 22d he had several attacks of vomiting. The following day his general condition was much worse. The intense dryness of the mouth returned. The pulse was 120 per minute and very weak; the temperature was subnormal. During the night of April 23d he became partially comatose. On the 24th he remained quite drowsy, and marked changes in the urine were first noted. Instead of having a low specific gravity, as heretofore, it was found to have a specific gravity of 1026, and contained an abundance of sugar, but no albumin. The comatose condition deepened during April 25th, and the patient died at 10.45 P.M., the coma having lasted for about thirty-six hours.

Various lines of treatment were tried throughout the course of the disease without avail. Blackett thought that the repeated shocks to the nervous system played an important part in the etiology of the diabetes in this case. —*Lancet*, November 25, 1899, p. 1434.

Malignant Endocarditis.—As the result of the study of ten cases, EBSTEIN (*Deutsches Archiv für klin. Med.*, Band lxiii., p. 217) draws the following conclusions: Malignant endocarditis may follow either an acute, subacute or chronic course. There is no certain and constant symptomatological picture in the various cases. Other things being equal, the earlier the cerebral symptoms appear the more rapidly fatal is the disease. Not the cardiac symptoms, but the general symptoms indicate the malignancy of the process. Among the important symptoms fever stands first, characterized not only by abnormally high temperature, but also by great variations, including sometimes typhus inversus. If endocardial changes cannot be demonstrated, and if there are no discoverable local alterations to explain the fever, it is necessary to be satisfied with the diagnosis of cryptogenetic septicopyæmia. If there are, however, foci to which the fever may be attributed the difficulty of making a proper diagnosis is sometimes insuperable. Chills, even if repeated daily and regularly, do not warrant the diagnosis of metastatic abscess in malignant endocarditis. There are, therefore, no positive signs of the pyæmic form of the disease, and the latter can be recognized only when metastatic suppuration can be demonstrated in other ways. The diagnosis of the typhoid form of malignant endocarditis is only proper when other possible causes of a typhoid state are not present.

Internal Secretions and the Regulation of the Circulation.—KAHANE (*Centralblatt für allg. Path. u. path. Anatomie*, Band x., No. 23) has an interesting article on this subject. He begins with a number of axioms, such as: All glands which are independent organs have an internal secretion; the principal function of this secretion is the regulation of the distribution of blood; there are relationships between the various blood-glandular organs and between the latter and certain vascular areas; growth and development, nutrition, and metabolism depend on a proper distribution of blood; diseases of the blood-glandular organs lead to disturbances of growth, development, metabolism and nutrition, varying according to the stage of development of the different organs. The discussion of the probable internal secretions of various glands does not bring out anything especially new. The author insists that the functional affectious of the internal secretions are more important to bear in mind than anatomical diseases of the various organs. So, for example, tuberculosis of the adrenals is important in the pathogenesis of Addison's disease only in so far as it affects the internal secretion of the glands. It is only according to this view that we can understand how in one case, notwithstanding anatomical disease, there is no Addison's disease; in another case, although there is Addison's disease, there is still no anatomical change in the adrenals. Similar statements could be made of the hypophysis and acromegaly. The well-known pathological relation between the parotid glands and the testes the author claims to indicate a relation in internal secretions. He also thinks that similar relations exist between the liver and the kidneys and the kidneys and the heart. In regard to the regulation of the circulation, Kahane points out that a number of glandular extracts exert an intense effect on the blood-pressure and the contraction of the bloodvessels. This is most obvious of the adrenal extract, which, when applied subcutaneously or in intravenous injections, causes a temporary but enormous increase of the blood-pressure, or applied on mucous membranes causes an almost complete local anæmia. Thyroid extract, on the other hand, causes a fall of blood-pressure without change of the heart's action, so that one must suppose that a dilatation of the arteries occurs. Hypophysis extract increases the blood-pressure with simultaneous increase of the heart's action, but without change in the frequency of the pulse, so that a contraction of the arterioles is probable. Regarding the other extracts, there are statements going to show that they all cause alterations of the blood-pressure. Studies of the diseases of the ductless glands point to the same fact. According to the author's theory, all the vascular alterations commonly attributed to the influence of vasomotor nerves are due to the internal secretions of the various glands. He admits that the fibres of the sympathetic and vagus are in fact concerned in the distribution of the blood, but insists that the irritation for these nerves is furnished by the internal secretions. This makes it clear to him why the blood-vascular organs are so richly innervated. The regulation of the blood-supply to the different parts of the body, according to him, is due to the interaction of the blood-vascular organs, and he makes an attempt at a scheme showing the relation of the various internal secretions to certain circulatory areas, thus the thyroid and the brain, skin and bones, the adrenals and the muscles, the pancreas and the portal circulation, the thymus and the aorta, the kidneys and the aorta, etc. The terms "hæmotrophy" and "dyshæmotrophy" are introduced in order to indicate whether the distribution of blood corresponds to the needs of the single organs and the whole organism, or otherwise, and, as the author says, when the principle of hæmotrophy is understood such crude ideas as the antithesis between anæmia and hyperæmia must be abandoned. The further details of the author's sketch are not necessary to reproduce here. The extracts given should suffice to call attention to the article and show its interest in the study of many problems in pathology.

Latent Fever in Chronic Tuberculosis.—MIRCOLI (*Deutsches Archiv für klinische Medecin*, Band lxiii., p. 162) gives a thoughtful and suggestive article on this subject. Formerly fever was considered an essential symptom in tuberculosis, notwithstanding the fact that a tuberculous infection might be seen to exist in organs such as the liver, joints, or peritoneum for years without rise of temperature. Maragliano emphasized the importance of fever in the late stage of tuberculosis and its relation to secondary infections by the common pyogenic bacteria, and Mircoli, in 1896, observed cases of undoubted pulmonary tuberculosis without fever. He noticed that, especially in many cases of so-called predisposition, tuberculosis was actually present without fever. He, therefore, studied the question experimentally. He early found, as Babes had previously done, that the injection of dead tubercle bacilli was more likely to produce a rise of temperature than the injection of living bacilli. This could be explained by the fact that the dead bacilli are more easily penetrated by the fluids of the body and their proteins absorbed. The pyogenic properties of tubercle bacilli are also exhibited by the old and new tuberculins of Koch, as well as other preparations of the specific organism. On the other hand, Maragliano discovered a group of substances which have an opposite effect on the temperature, and these observations were confirmed by de Schweinitz and Dorset. These substances, which are toxins, are continually formed anew, and enter the circulation, and therefore affect the organism in a uniform manner. On the other hand, for the activity of the proteins it is necessary that the bacilli be dead and the organism dissolve them. Their biological action is, therefore, limited, and depends on accidents. The fact that lower temperatures may occur in infectious diseases has been overlooked on account of the conventional belief that the single characteristic of fever is an elevation of temperature, although it has long been known that certain infectious diseases, such as typhoid, recurrent fever, staphylococcus and streptococcus septicæmia, etc., sometimes have no elevation of temperature, either at times or during their whole course, or may even have an abnormally low temperature. Moreover, while we know that certain other organic substances, such as milk, peptone, etc., cause an elevation of temperature, others, like urine, bile, and snake-poison, reduce the temperature. Mircoli studied the temperature of tuberculosis in animals. In one hundred and twenty guinea-pigs inoculated with various quantities of bacilli the more important results were as follows: When the infection is intense, as by two and one-half milligrammes, the elevation of temperature begins in the second week. It sometimes increases, sometimes decreases, but persists almost constantly until death between the twentieth and thirtieth day. With a smaller quantity, say one milligramme, there is at first an elevation of temperature, but the course soon becomes apyretic and then just before death, between the second and third months, rises again. With a still lighter infection, as by one-half milligramme, the course is typically apyretic, with very rare elevations of temperature during the whole disease, which may last from four to six months. Regarding the relation between the temperature curve and the anatomical changes in guinea-pigs, there are many striking contradictions, although an extensive and sudden infection is likely to produce high temperature. In other words, the range of temperature is not so dependent on the extent of the anatomical process as on the mode of action of the tuberculous poison which produces it. The study of the temperature in human pulmonary tuberculosis is surrounded with difficulties on account of the impossibility of knowing the exact condition of the alterations. Mircoli is undoubtedly right in raising the question whether what we call evident pulmonary tuberculosis is not really the later stage, the so-called predisposition, actually the stage of maturity, of the disease. In studying the temperature-curve of out-patients he found that elevation due to tuberculosis was extremely rare. In many cases with extensive anatomical lesions of the lung and many bacilli in the sputum, normal and subnormal temperatures (axillary) were found. He therefore studied the heat-regulating functions in these cases. Other writers had previously assumed that the temperature in tuberculosis follows a lower plane than in most other febrile diseases. So Volland held that fever in tuberculosis begins at 37° or, at the extreme, 37.2° C. Spengler assumed the presence of fever if the temperature was above 37.5° in the rectum or above 37° C. in the axilla. This peculiarity cannot be explained by such things as anæmia, because the author found low temperature in patients with an actual increase of the red globules.

That the low temperature is actually due to a hypothermogenic substance was demonstrated by injecting serum of a febrile tuberculous patient into other afebrile tuberculous persons. The result was that the temperature sank lower in these patients than the author had ever observed before. Mircoli studied the temperatures in the rectum and axilla, and found a greater difference than the half degree Centigrade usually considered normal. It often amounted to 1° and sometimes as much as 2° C. This difference is not constant at different times of the day in the same patient, but is usually less in the morning and greater in the afternoon. Mircoli found an inverted type of temperature very rarely in tuberculosis, and does not think there is any particular type for the latent fever. The sweating of tuberculosis has sometimes been considered a consequence of rise of temperature. Careful observation, however, proves that this is not so, and Maragliano was able to find an ethereal extract of tuberculous toxin which produced sweating without affecting the temperature. Chetrien, who studied the subjective fever of tuberculous patients, found that in some of them there was a subjective feeling of fever, although the temperature in the axilla was not elevated. To sum up, the author holds that the thermal level in tuberculosis is somewhat lower than in health—*i. e.*, from 2° to 5° C.; that the difference between the internal and external temperatures is greater, on the average 1° C.; that the sensibility to internal and external thermogenic factors is increased; that there are thermopsychic phenomena which indicate the transition from the latent to the manifest form of tuberculosis. Studies in metabolism parallel to the preceding observations are promised.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL;

ASSISTED BY

ALFRED C. WOOD, M.D.,	AND	C. L. LEONARD, M.D.,
INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.		ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

Partial Retention of Urine, Its Consequences and Treatment.—WARDEN (*Edinburgh Medical Journal*, July, 1899) points out the fact that an incompletely emptied bladder is a difficult condition to diagnose, and yet it is all important that early treatment should be instituted, which will prevent the complications which follow this condition if it remains undetected and untreated. The ensemble of symptoms is, however, so complete in these cases that when once found the diagnosis is absolute. Prostatic enlargement is the disease which produces most of the cases of partial retention, and yet it is often not until there is complete retention that the patient complains of any symptoms referable to the bladder. The recognition of the early symptoms is, therefore, very essential. They are nocturnal polyuria and persistent digestive troubles. Bimanual rectal examination will clear the diagnosis, while the catheter will prove it beyond a doubt. Care should be taken not to empty the bladder too rapidly. This may be done very gradually, and yet completely, by stopping before it is empty, injecting warm boric-acid solution, and again partially emptying, repeating the process until the urine comes away clear. The golden rule is to empty the bladder often, for long and aseptically. If the early period of prostatic enlargement be tided over successfully one may hope to be spared the greater anxiety of later complications.

When the stagnation of urine becomes so prolonged and extreme as to be accompanied by positive distention of the bladder it forms the most serious and most intractable, and yet the most overlooked, of all forms of partial retention of the urine. The central fact of the condition is the distended state of the bladder, which makes itself felt throughout the whole of the urinary tract, from the ureters to the parenchyma of the kidneys themselves; the disorders thus set up, at first functional, soon become organic, and as there is yet no infection, and, therefore, no cystitis, there is nothing beyond some frequency of micturition to direct attention to the urinary apparatus. The patient's tongue is red and dry, and coated to such a degree that swallowing and even mastication become intolerably distasteful. Vomiting and diarrhœa may set in, or the dyspepsia may express itself simply in loss of appetite and headache and a sense of gastric weight. On the other hand, constipation of most obstinate form may be the predominant feature of the digestive disturbances. The whole system may present an appearance that would make a diagnosis of cancer of the stomach possible. The patient will be found to be passing large quantities of urine, and the author says "it cannot be too dogmatically stated that when the three symptoms—polyuria, frequency of micturition, and grave digestive troubles—are present the *fons et origo mali* is almost certain to be the bladder that the patient cannot empty." The greatest care should be taken in these cases to keep the bladder empty and not to infect it with the catheter.

Wounds of the Heart and Pericardium.—Loison (*Rev. de Chir.*, 1899, Nos. 1, 2, 6, and 7) reaches the following conclusions, after an exhaustive study of this subject, in which he reviews all the literature and tabulates all the reported cases.

1. The symptom-complex of wounds of the heart and pericardium is no less certain than that of the peritoneum or of certain abdominal viscera.
2. The diagnosis is as difficult and as delicate in the one case as in the other, and requires all the surgeon's vigilance.
3. The prognosis is not always grave, as the statistics which the author has collected and Fischer's show.
4. Therapeutics are not unavailing, as has been proved by numerous successful interventions which have lately been carried through by various surgeons.

The author has tried to show that there is a greater field for active intervention, and that such intervention has a chance of success.

Shock in Modern Surgery.—SHRADY (*Medical Record*, July 22, 1899) points out very clearly the great danger that threatens modern surgery. The perfection to which aseptic technique has been developed makes it possible for almost any practitioner to perform major operation. The patient is under the anæsthetic and feels nothing; asepsis secures primary reunion, so that the operator can take all the time he desires, and if the patient dies it is attributed to shock, for the wound is aseptic and there has been no great loss of blood.

This author points to the difference between modern and the former age of surgery, where brilliant operators, with perfect technique and lightning rapidity, operated without anæsthesia or antiseptics, and secured wonderful results. They could not depend upon anæsthesia and asepsis to cover the defects of technique, but by the rapidity of their operations saved so much of the shock to the patient that his vitality could do more for him.

Shrady says: "We must not forget that prolonged administration of anæsthetics is, independently of the operation, a means of shock in itself. While ether may tend at first to modify shock, its prolonged use adds to the depression of the patient. The same may be said for chloroform. The bodily temperature is lowered if the administration of ether continues longer than an hour or an hour and a half. Often, especially in chloroform cases, the normal temperature is not restored until the lapse of twenty-four hours. This delayed reaction is itself an evidence of serious mischief done to the nervous centres. These changes are often sudden and correspondingly dangerous. Although more frequently seen with chloroform, they occur often enough with the safer anæsthetic—ether—to place us on our guard.

"It is not inconsistent with carefulness that we should do our work more quickly. We should shorten not only the period of anæsthesia, but that of the operation itself. To do whatever is absolutely necessary, and do that as quickly as possible, is the primary consideration. Of the two methods of procedure the one that takes the shortest time should always be preferred. In grave and prolonged operation, it is much safer to divide the work into two periods, if possible, rather than strain a point to finish it in one."

There is a certain larger amount of shock in all operations in highly nervous areas, as is evidenced by the extra amount of anæsthetic required. In the preanæsthetic days the effect of the division of a nerve or bone was seen immediately in the pulse. There can be no doubt but that there is still much of this shock felt by the system despite the anæsthesia. "Quick reaction follows quick operation. The two hold a proper relation to each other for good. On the contrary, the longer the operation the longer is the reaction delayed. How often do we hear that the patient failed to rally after hours of fruitless stimulation?"

A New Invagination Method of Intestinal Anastomosis.—MORISANI (*Centralblatt f. Chirurgie*, 1899, No. 32) describes a new method of anastomosis which he has employed with success in a number of cases, and has proved by experiments on animals to be technically efficient in all cases.

A strip of mucous lining is removed from the inner surface of the distal end of the intestine, so that it permits the proximal to be invaginated into it. When this has been accomplished it is held in place by fixation sutures, while a continuous suture unites the cut end of the distal portion of the gut, with its raw muscular layer, to the serous surface of the proximal or invaginated portion. The process of invagination protects the stitches and the line of union in a degree from contamination by the intestinal contents, while strengthening it against pressure from within. The denuding of the muscular coat where it is brought in contact with the serous surface of the proximal portion in the line of union hastens the reparative process and frees the wound from the contamination of the intestinal contents. The histological examinations made on the experimental cases showed that firm adhesion is present in twenty-four hours, and that there is no contraction of the lumen of the gut. The method is free from the objections made where foreign bodies are employed, while the suture line is protected from infection from within the bowel.

Remarks on a Case of Total Extirpation of the Stomach and the Treatment of Gastric Cancer.—RICHARDSON (*Boston Medical and Surgical Journal*, September 28, 1899) reports the findings at an autopsy in a case in which he removed the entire stomach. There was a recurrent mass at the left of the epigastrium, which had infiltrated the peritoneum under the rectus and had spread about the walls of the small intestines. There were nodular masses in the mesentery of both large and small intestines. Minute nodules were scattered everywhere. Near the splenic flexure the lumen of the colon was totally obstructed. Beyond this point the bowel was collapsed; above it was enormously distended. The orifice at the point of anastomosis was large enough for the passage of food, and the parts were firmly bound together. There was no sign of recurrence at the line of junction.

The author concludes from the case, first, that the patient's health would have been fully re-established had there been no recurrence of the original disease; second, that the suffering was due to the mechanical effects of a chronic obstruction rather than to cancer itself: finally, that œsophago-duodenostomy is technically possible in a certain percentage of cases.

As regards operation in cases of cancer of the stomach this author says: The first indication for operation is a strong suspicion that malignant disease is present. Even then operation is inadvisable in marked cachexia (other than hemorrhagic), and in such diseases of other organs as will compromise success—diseases of the heart, lungs, kidneys. The local lesion may be out of proportion to signs, or *vice versa.* Local signs that justify resections are circumscribed tumors without contiguous or remote implications. Infiltrating masses not sharply defined which approach contiguous viscera so that they must be closely shaved do not justify radical measures. When complete removal of the diseased tissue requires complete extirpation of the stomach there is no local contraindication if the operation is technically possible.

It seems clear that radical operations upon the stomach must necessarily be infrequent. A case favorable enough to justify so serious a measure as partial resection cannot often present features that are favorable as to time, extent, complications, and general constitutional excellence. If partial excisions are thus limited complete extirpations must be still more infrequently justifiable. The only method of discovering favorable cases for operation is earlier exploratory laparotomy.

The Wisdom of Surgical Interference in Hæmatemesis and Melæna from Gastric and Duodenal Ulcer.—Armstrong (*British Medical Journal*, October 21, 1899) reports two cases which have called his attention to the result of delay in operating, which is in a great measure dependent upon the two conservative tendency reflected in the medical literature of to-day.

When aneurism and leukæmia have been excluded, which should be readily possible in the latter case by the aid of the microscope, he holds that it is the surgeon's duty to interfere in suitable cases, which he defines, first, as those of frequently repeated small hemorrhages which persist in spite of medical and dietetic treatment, and threaten to destroy the life of the patient; and, secondly, in all cases of large hemorrhage which, in spite of medical and dietetic treatment, recur. In these cases he advocates operation after the second hemorrhage. With hemorrhage occurring in cirrhosis and portal obstruction, he does not think that the surgeon can accomplish any good. In these cases the hemorrhage is from a varicose œsophageal vein, a part difficult of access, and is secondary to a pathological lesion but little amenable to any form of treatment.

In cases of gastric and duodenal ulcer, however, the conditions are totally different. The lesion is primary and local, and in addition to the securing of the bleeding point a more smooth and rapid convalescence is obtained, the likelihood of perforation removed, and if found advisable the performance of a gastro-enterostomy or pyloroplasty secures to the stomach that rest which so favors the healing of the ulcer and ensures against the subsequent occurrence of narrowing and obstruction to the pylorus.

The Technique of Gastro-enterostomy.—Rutkowski (*Centralblatt für Chirurgie*, 1899, No. 39) has had very satisfactory results from combining with Wölfler's gastro-enterostomy a temporary gastrostomy by either Witzel's or Kader's method. After performing the gastro-enterostomy he makes a small incision above it and passes in through this a drainage-tube which is brought out of the abdominal wound after one of the above-mentioned methods of gastrostomy. The tube passes into the stomach, through the opening of the gastro-entero-anastomosis, down into the afferent portion of the jejunum.

The combination of these two operations in one affords an opportunity for the immediate nourishment of the patient without the danger consequent upon feeding by the mouth, while the gastric juices that collect in the stomach have every opportunity to pass along beside the tube into the bowel. After a lapse of ten days, when the patient has recovered from the operation and the union is complete, the drainage-tube is removed and the gastric fistula closes spontaneously.

The author briefly reports three cases in which this method of operating led to very satisfactory results.

Two Cases of Primary Sarcoma of the Tongue; one Pedunculated, the Other Interstitial—Downie (*British Medical Journal*, October 21, 1899) reports two cases of this rare form of sarcoma—*i. e.*, lingual. One was pedunculated and the other interstitial, with a marked involvement of surrounding structures.

He compares these two cases with the following results:

1. In the first the early discomfort was supposed to be due to a simple catarrhal inflammation of the throat, while in the second it was considered to be the result of injury.

2. The pedunculated growth did not involve the tissue of the tongue to any depth, while the tumor in the second case was situated deep in the substance of the tongue.

3. The growth of the neoplasm was in the first case rapid, and unaccompanied by œdema, while the interstitial tumor was of comparatively slow growth, and its presence was accompanied by considerable œdema of the organ.

4. The disease in the first case was confined to the tongue, while in the second case several secondary growths appeared at an early stage.

Osteoplastic Operation on the Mastoid Process.—Küster (*Centralblatt für Chirurgie*, 1899, No. 43, p. 1145) describes an osteoplastic technique which he has employed with success for the past five years in operations on the mastoid sinus. It consists in raising by means of a broad chisel a flap which is made up of skin periosteum and bone over the mastoid sinus. The ear is drawn forward and the incision made posterior to the muscle down to the bone through the periosteum. The flap has its base toward the ear. The periosteum is freed only sufficiently to allow the chisel to map out three sides of the flap, which is then cut from the surface of the bone and turned back in contact with its covering of integument. The operation is completed upon the sinus. It is packed with gauze as usual, and an end brought out through the wound. A piece is cut from the bone flap with rongeur forceps sufficient to permit the easy passage of the gauze. The flap is then sewn in place.

The value of the results attained are to have a linear scar without deformity and to preserve the form of the bone. The operation is no more difficult or dangerous than the ordinary method, and can be performed rapidly. The pressure that can be applied where the sinus has been injured is greater with a greater aseptic security. The healing is by primary union, and the result from a cosmetic stand-point all that could be desired.

Traumatic Paralysis of the Shoulder and Arm.—Mally (*Revue de Chirurgie*, October 10, 1899) gives the following as the results of traumatism that is acute in character:

1. Complete paralysis in the terminal fibres of the nerve.
2. Loss of cutaneous sensibility in the distribution of the nerve. This varies in different individuals.
3. Rapid muscular atrophy.
4. A special reaction of degeneration in the muscles.
5. A histological degeneration of nerve and muscle.

These traumatisms produce nearly all the neuropathological conditions. The lesion may involve the nerve in all degrees, from the terminal fibres in the hand to the larger trunks in the axilla, and even to the plexuses and nerve-roots. They may even reach the fibres in their medullary course. The derangements of sensation which accompany these paralyses are very inconstant. They are not to be depended upon in judging of the motor involvement. The degrees of involvement are also very variable, from simple irritation to complete solution of continuity.

The histological lesions are divisible into three groups: 1. Lesions that are irritative, in which the condition of the muscles and nerves is ill defined and recalls the lesion of the atrophy of degeneration. This condition is transitory and does not tend either to increase for the worse or to rest stationary. It is the simple atrophy of paralyses by compression; it is difficult, as a consequence, to recognize it experimentally. 2. Degenerative changes which are represented by a return to embryonal conditions of the anatomical elements; it is this atrophy of degeneration that accompanies the section of nerves, their tearing or very severe compression. 3. Numerical atrophy, as described by Klippel, which consists in a diminution in the number but not in the volume of the anatomical elements—these are the grave reflex paralyses, together with certain myelopathies, traumatic or otherwise.

The electrical reaction which corresponds to each of these three pathological conditions is very distinct, and serves to differentiate between them at an early period. The simple atrophy has no relation either quantitative or qualitative to the electrical excitability, no matter what the degree of atrophy.

Degenerative atrophy is always accompanied by the reaction of degeneration. Finally, the numerical atrophy has a quantitative diminution only to the electrical excitability of two currents.

Hysterical paralyses can be readily diagnosed, especially if electrical tests are employed. The reflex paralyses are the only ones that can be readily confused.

Suture of the Fibrous Capsule in Fracture of the Patella.—VALLAS (*Revue de Chirurgie*, October, 1899) discusses the value of different methods of treating fractures of the patella, and, while not advancing it as an original idea, holds that both his experience and anatomical considerations justify him in believing that the suture of the fibrous capsule is as essential in those cases where surgical intervention is demanded as is the suture of the bone, and that it will, in the majority of instances, produce a better fibrous union if not bony union. It is better to employ it alone than suture of the bone alone.

He describes his method of treatment as follows: The fractures in which bone alone is involved are to be treated by compression, massage, and early movements, as in hæmarthrosis of the knee.

Those fractures of the patella that are accompanied by a rupture of the fibrous sheaths surrounding the bone require radical treatment. The operation of choice is an arthrotomy with a toilet of the articulation and suture of the lateral tears of the capsule. The suture of the bone is unnecessary.

It is often difficult to decide the particular case at hand. As a rule, a separation of three-quarters of an inch or more requires operation. All surgeons agree thus far. When the limb is extended such separation is impossible without a rupture of the lateral portion of the capsule. But it frequently happens that these portions of the capsule are ruptured without so much displacement. These are the cases that give trouble later. The author has made it his practice to wait three or four days, treating these cases for the hæmarthrosis. At the end of this time the swelling and pain have decreased and more definite knowledge can be obtained. It is sometimes possible to recognize by palpation a lateral tear. At the end of the fourth day, if it is a simple fracture, the patient can lift the limb from the bed. If he can do so, operation is not necessary. If he cannot, operation should be undertaken at once.

PEDIATRICS.

UNDER THE CHARGE OF
LOUIS STARR, M.D.,
OF PHILADELPHIA,
AND
THOMPSON S. WESTCOTT, M.D.,
OF PHILADELPHIA.

Cerebro-spinal Meningitis Complicating Measles.—FRANK W. ENGLAND (*Montreal Medical Journal*, November, 1899, p. 850) reports the case of a healthy boy, aged six years, who had a mild attack of measles. On the third day the eruption was beginning to fade, and the temperature and pulse had fallen to normal. On the following day he appeared somewhat dull and inclined to doze. There was some obstruction to breathing through the left nostril, which was blocked with a membranous exudation. The cervical glands, however, were not enlarged, the throat was clean, and the pulse and temperature remained normal. A few hours later, without the slightest warning, the child was seized with a severe general convulsion. This was followed by continued moaning and restlessness, with deepening stupor. A second convulsion occurred about ten hours after the first, slight in character, chiefly affecting the tongue, which was protruded in a jerky manner, with much frothing at the mouth. The temperature had risen to 103° F., and the pulse had become rapid.

After the convulsion restlessness was very marked. Two hours later the temperature reached 105° F., the stupor had increased, but the pupils still reacted to light and remained equally contracted. There was some rigidity of the muscles, but the head was not drawn back to any extent; there was neither squint nor any other sign of paralysis. No urine had been passed for twenty-four hours, and then only two and a half ounces were withdrawn by the catheter. The specimen was high colored, slightly acid, of specific gravity 1028, no albumin, no sugar, no casts. Convulsions recurred twenty-four hours after the second one, and from this time the child passed from one into another until death occurred, two hours thereafter and thirty-eight hours after the first convulsion. The temperature reached 109° F. before death. There was no vomiting throughout, and no cutaneous eruption. Two hours before death a culture was taken from the nose, and this showed the presence of the diplococcus intracellularis. Cultures from the noses of two other children of the family showed the same organism. From this and other confirmatory negative evidence the author considers the case one of epidemic cerebro-spinal meningitis, the port of entry of which infection was doubtless the nose. The author refers to the view of Dr. Adami, who has reported the finding of meningococci in the nose as well as the meninges in a case of cerebro-spinal meningitis, that the nose was, in his opinion, a common avenue of infection in such cases.

It is interesting to note that two of the other children who were ill of measles at the same time also developed a similar condition of the nares—namely, a membranous rhinitis—which, in spite of treatment, lasted three weeks. The membrane was abundant, thick and firm, completely plugging the nose for days, and when detached left a bleeding surface. In addition to the membrane there was a copious muco-purulent secretion. Cultures taken ten days after the onset showed the meningococcus and the staphylococcus. The author has been unable to learn of any other reported case of cerebro-spinal meningitis complicating either measles or scarlatina.

Concerning the Infectious Character of and the Relation Between Acute Articular Rheumatism and Chorea.—WESTPHAL and WASSERMANN (*Berliner klinische Wochenschrift*, 1899, No. 29) describe, among other cases more briefly mentioned, a case of acute articular rheumatism in a patient aged nineteen years. During the second month after the onset of the arthritis choreiform movements began in the left arm, and in a few days involved the whole of the voluntary muscles of the body. The mental functions were distinctly disturbed. The pulse was very rapid, 96 to 140, but no valvular abnormality was detected. Labial herpes appeared, and the patient shortly after died in severe delirium.

At autopsy an early endocarditis of the mitral valve and parenchymatous nephritis were found. There was no suppuration. From the blood, the brain, and the mitral valve was obtained a micro-organism which, when introduced into the blood of animals, produced high fever and arthritis of grave type. The joints thus involved were found inflamed in all their structures, and in the exudate, which was either clear or turbid, the same micro-organisms were found. They possessed the property of inducing similar changes in the joints of other animals into whose blood they were in turn injected. In some of the experimental cases swelling would subside in one joint to begin actively in another far removed from it. This organism was a streptococcus belonging to the class supposed for some time to have a causal relation to acute articular rheumatism.

Tetany Simulating Tetanus.—GUINON (*Société de Pédiatrie*, October 20, 1899; *Revue Mensuelle des Maladies de l'Enfance*, November, 1899, p. 524) reports the case of a boy, aged four and one-half years, who, after complaining for three days of paroxysmal pain in the knees, was brought to the hospital with all the signs of tetanus. There was marked trismus, stiffness of the neck, and paroxysms of opisthotonos upon the slightest touch. There was, however, no fever, but Roux, who saw the case in consultation, inclined to the diagnosis of epidemic cerebro-spinal meningitis. This, however, was not confirmed by the subsequent course of the case, which resolved itself into a tetany, as shown by the fact that opisthotonos was produced only under certain definite conditions, and by the fact that after a few days appeared two symptoms absolutely characteristic of tetany: a contracture of the eyelids and a contracture of the lips with the carp's snout appearance of the mouth.

All these symptoms disappeared suddenly on the tenth day, upon the appearance of an otorrhœa, following a median otitis, which had escaped observation. During convalescence the child had incontinence of urine and feces.

This is the second instance in which the author has observed a tetany with symptoms of tetanus, and he thinks the condition deserves to be classified as tetany of the pseudotetanus form.

Treatment of Rhachitis by Suprarenal Extract.—STOELTZNER (*Berliner klinische Wochenschrift,* September 11, 1899) has treated seventy-six cases of rhachitis with suprarenal extract, and under its use he has observed rapid alteration in the general condition, diminution of the sweating, of the vasomotor irritability, and of cranio-tabes. The thorax became firmer, the teeth appeared, and the power of locomotion was gained about the normal time. Laryngospasm was the only symptom that seemed to resist the treatment. The post-mortem of an infant that had died of bronchitis during the treatment showed normal calcification of the bony substance and almost complete disappearance of the osteoid tissue.

Formaldehyde as a Milk Preservative.—A. G. YOUNG (*Proceedings of American Health Association,* November, 1899; *Medical Record,* November 11, 1899) makes the following conclusions in regard to the action of formaldehyde as a preservative of milk: 1. That used as a preservative it tends at least to impair the nutritive value of milk. 2. Its tendency is to interfere with the digestive processes. In either case it is only a question of dosage, and the limit of safety is difficult to determine. 3. That though the inhalation of formaldehyde gas is much less dangerous than the breathing of the other gaseous agents much used as disinfectants, the results of tests upon animals, and of one case of accidental poisoning of a human being, indicate that formaldehyde taken into the digestive system may produce dangerous and even fatal results. 4. It would be unwise and unsafe to encourage or to suffer the use of formaldehyde in the public milk-supply, even under any possible restrictive regulations. 5. In every State, as is now the case in many, there should be a law prohibiting with effective penalties the use in milk of any chemical preservative whatsoever.

Treatment of Prolapsus Ani by Ice Tampons.—HAJECH (*Revue Mensuelle des Maladies de l'Enfance,* November, 1899, p. 525) recommends for the treatment of chronic prolapse a procedure which has always been successful in his hands, even in the gravest cases. It consists in the introduction of fragments of ice into the anus during the reduction of the prolapse. These suppositories should be cone-shaped, artificially frozen, measuring 7 to 8 cm. in length, and in diameter at the base 2½ to 3 cm. One of these is enveloped in a piece of iodoform gauze, which should cover it like a glove-finger, and is pushed into the centre of the prolapse, which can thus be readily reduced, the ice and gauze being carried up with the protruded bowel. Usually no painful sensation is produced and the tampon is not expelled. After each defecation a new gauze and ice tampon is introduced. The prolapse occurs more and more rarely, and soon ceases. This result is due to the relief of congestion and the increased contractility of the rectal tissues under the influence of the mechanical and thermic excitation provoked by the ice.

Erosion of the Tonsil following Scarlatina.—BERGÉ (*Société de Pédiatrie*, October 10, 1899; *Annales de Médecine et Chirurgie Infantiles*, November 1, 1899, p. 819) reports the observation of a mild and benign case of scarlatina in a girl, aged four years, which was followed after an interval of fifty-four days by a superficial ulceration upon the face of one of the tonsils, which persisted for nearly a month. At the beginning it was accompanied by fever and swelling of the glands at the angle of the jaw and in the cervical chain. Later there was acute nephritis characterized by blood and albumin in the urine, and slight puffiness of the face. The erosion slowly healed, leaving a grayish-yellow scar which was visible three months afterward.

Hæmophilia.—GEORGE W. WAGNER (*The Physician and Surgeon*, September, 1899, p. 397) reports two marked cases of this diathesis, in which he seemed to arrest hemorrhage, after other means had failed, by exposure of the wound to the air in conjunction with the application of very hot water by means of little pledgets of absorbent cotton. In one case the hemorrhage followed amputation of a portion of a finger, and in the other, a Jewish child, aged four years, it came from a small laceration of the mucous membrane of the upper lip at the frænum. In the latter case the lip was rolled upward and kept in this position by strips of adhesive plaster in the form of an inverted T, the ends of the cross-piece being fastened to the cheeks and the perpendicular to the forehead. From a study of the literature he concludes:

1. That hæmophilics make blood rapidly, the cause of which is undetermined.

2. That there is a tendency to plethora of the smaller vessels, especially of the capillaries.

3. That the deficiency of oxygen in the blood is one of the main reasons for its slow coagulation.

4. That the narrow lung space, at least in some cases, is a factor in the deficient oxygenation of the blood, and would suggest that in future the capacity of the lung space should be carefully noted.

5. That apparently the best remedy to control hemorrhage is oxygen, either by inhalation or contact. It acts in two ways, causing greater rapidity in the coagulation of the blood, and causing the nuclei of the endothelial cells of the capillary wall to swell and to narrow the lumen of the vessel.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Treatment of Pulmonary Tuberculosis.—DR. HOMER M. THOMAS presents his results from the use of inhalations of antiseptic nebulæ. He believes that he has obtained microscopical proof of the penetrability of vaporized medicaments into the pulmonary alveoli. The value of nebulization is stated to be (1) control of cough; (2) relief of dyspnœa; (3) intimate contact of antiseptic nebulæ upon fourteen hundred square feet of respiratory capacity; (4) inhibition to the extension of tuberculous foci. The advantage of controlling cough by inhalation rather than by internal medication is self-evident. By bringing to the inflammatory areas, through direct contact, especially adapted expectorant or anodyne combinations, many or all of the distressing symptoms from cough may be allayed. The relief of dyspnœa incident to the blocking of the larger or smaller tubes by catarrhal products is often marked. An abundance of air compressed to from fifteen to thirty pounds to the square inch is necessary. This should pass through a series of antiseptic chambers to rid it of all impurities, and after purification and compression it should be passed through oil of cloves. In cold weather the air should be warmed to 60° or 70° F. before using. To relieve cough a mixture of tincture of stillingia and beechwood creosote, with lanolin as a base, is often quite sufficient. For dyspnœa, ammonium carbonate, syrup of squill, and syrup of wild cherry, with lanolin as a base, often give marked improvement by removal of catarrhal blocking of bronchial tubes. For antiseptics, eucalyptus, oil of cloves, beechwood creosote, 10 per cent. solution of iodoform in ether, and lanolin are serviceable. A 10 per cent. solution of pure Ceylon cinnamon oil in lanolin is an excellent stimulant to the bronchial mucous membrane. Formalin, however, appears to be the most valuable antiseptic when used as a 4 per cent. solution of the 40 per cent. aqueous commercial solution in water. This is placed in the nebulizer and violently agitated by means of compressed air. This solution is not nebulized, but evolution of this gas, through a mechanical mixture and agitation due to the pressure of compressed air, is preferred. Patients acquire an increasing tolerance of the formalin mixture, and by degrees its strength can be increased to 20 per cent. Its administration, however, must be immediately stopped so soon as cough ensues. Fifty patients, all in the second or third stage of this disease, were under observation during five months. Fifteen gained in weight from two to twelve pounds; thirty-four lost weight, and five remained stationary. Various forms of apparatus may be employed to compress the air. A double glass tube so constructed as to occlude the anterior nares will enable the patient to inspire freely through the nasal passages. The nebulæ can be admitted through a single glass tube held between the lips, slightly compressed, and inhalation will take place through the mouth as well as an admixture of atmospheric air through the nares. The preferable method is the use of a pure rubber funnel top, such as is used for gastric lavage. This is readily adjusted to all the irregularities of the facial contours, and very little of the nebulæ escapes, while deep inspiratory efforts can be made simultaneously through the nares as well as the oral opening. —*Western Medical Review*, 1899, No. 10, p. 330.

Phthisis Treated by Epidermic Application of Guaiacol.—Dr. A. F. Shoyer, from a study of the literature, concludes: 1. Many encouraging results are reported. 2. The drug is absorbed by the skin. 3. Antipyresis is undoubted. 4. There may be profuse night-sweats, exhaustion, and collapse. 5. The temperature tends subsequently to rise to a higher level. In his own experience a rapid fall of temperature follows application of the drug. To avoid the sudden decrease in temperature and accompanying prostration, guaiacol was applied when the temperature was at its minimum. The drug may be painted on the skin, or applied on wool beneath a watch-glass, or as a compress. Six minims of guaiacol thrice daily, increased to thirty minims, was the usual amount prescribed. Absence of effect resulted in many instances. It is suggested that ether previously applied might aid absorption. Of fourteen patients thus treated the average gain in weight was 2.32 pounds. Of twelve unselected patients, the average weekly gain was 1.25 pounds. Of twenty-five patients ten improved, twelve were unaffected, three grew worse. Five of the ten who improved were febrile and more or less free from secondary infection; three were subfebrile and probably infected by germs of suppuration, and two were indefinite. The conclusion reached is that the patients most favorable for treatment are those with pyrexia and free from secondary infection. Patients with subfebrile temperature do fairly well. If there is apyrexia, no effect follows treatment, while if both pyrexia and marked secondary infection are present bad results follow. Most of the patients discharged improved subsequently returned worse, so that no permanent effect was obtained.—*The Scottish Medical and Surgical Journal,* 1899, vol. v. p. 204.

Physiological Action and Therapeutics of Guiamar.—Dr. George F. Butler speaks very highly of this drug. It is the most recent of the derivatives of the phenol group. Commencing with crude creosote, steady advancement has been made. Benzosol (guaiacol benzoate) and guaiacol carbonate are limited in usefulness, owing to their irritating action. Both drugs are insoluble in water; the glycerol ethers are soluble in water; the acidity of phenol is replaced by a pure bitter taste. Guiamar is the glycerol ether of guaiacol, and is formed by the action of anhydrous glycerin or pure guaiacol. It is a dry, white, crystalline powder, soluble in alcohol, chloroform, etc., and in about twenty parts of water at ordinary temperature; it is neutral, non-hygroscopic, with a bitter, aromatic taste. Guiamar is compatible with quinine, cod liver-oil, malt, hypophosphites, and pepsin. It is antiseptic chiefly through the liberation of nascent guaiacol, partly in the stomach, but chiefly in the intestinal canal. Glycerin also is set free. This decomposition occurs only at the site of diseased tissues; in a healthy normal stomach it is doubtful if guiamar undergoes any change. It does not interfere with normal digestion, but has a tonic effect; thus, in impaired nutrition, marked improvement actually occurs. Like other members of the group, guiamar is also antipyretic, diuretic, and diaphoretic. It is readily absorbed through the unbroken skin. Its antiseptic properties are fully equal to other drugs of the same class; the chief advantage in guiamar is that through its stomachic properties it stimulates appetite and digestion. If there be gastric fermentation or putrefaction (dilatation) guaiacol is liberated and bacterial development is checked. Peristalsis is also stimulated.

The dose is from three to fifteen grains thrice daily, if no irritation of the genito-urinary tract occurs. Patients having typhoid fever to whom guiamar was given had less fever, and the general symptoms (?) were less severe. In twenty thus treated (cold baths also being used) there was no marked tympanites and no intestinal hemorrhage. The digestive system remained in excellent condition. When the drug had been exhibited for several days, in most cases the stools became inodorous. An ointment of guiamar and lanolin, two drachms to the ounce, applied to painful joints in acute rheumatism greatly lessens the pain. In several instances gonorrhœal arthritis treated locally with guiamar, drachms two; belladonna and mercury ointments, of each drachms four, met with marked success. Guiamar is a valuable expectorant in chronic bronchitis and bronchopneumonia. Fetid expectoration is much benefited (antiseptic effect). In initial pulmonary tuberculosis, and to a less extent in later stages, night-sweats, cough, and expectoration are much improved. Bed-sores treated with guiamar and balsam of Peru, of each one drachm, benzoinated zinc oxide ointment to one ounce, improve rapidly. Guiamar can be used for a variety of conditions requiring local antisepsis; it is unirritating in aqueous solutions, and can be applied to open wounds. The drug is a powerful genito-urinary antiseptic (chronic cystitis), but does not counteract excessive alkalinity as rapidly as benzosol. An idiosyncrasy is sometimes formed, guiamar causing considerable dysuria. In blennorrhœa and gleet guiamar is superior to benzosol as an internal remedy. In the intestinal tract it is invaluable as an antiseptic, acting locally. The summer diarrhœas of children (especially those due to bacteria) are immediately benefited, intestinal decomposition ceasing.—*New York Medical Journal*, 1899, vol. lxx. p. 438.

Iodine in the Treatment of Scorbutus.—DR. MARTINORD reports that four or five drops of the tincture of iodine in a small glass of brandy, thrice daily, relieved in a few days, and soon cured, a patient under his care. A second instance, even more remarkable, was one showing much subcutaneous hemorrhage, gangrenous wounds, and diarrhœa.—*Klinisch-therapeutische Wochenschrift*, 1899, No. 29, S. 950.

Suprarenal Extract in Surgery.—DR. A. G. ALDRICH has made use of this vasoconstrictor in the surgery of the eye, ear, nose and throat. It also contracts erectile tissue, and for these reasons is of great value in operations upon mucous membranes. The solution is: Suprarenal extract, 1; boric acid, 1; sterilized water, 48; filtered and made up at the time of its use. The local action endures from twenty minutes to one hour. It allows a deeper and more perfect anæsthetic action when used in conjunction with cocaine; hæmostasis is more prolonged, and secondary hemorrhage is prevented. It is reliable in action, does not injure the tissues operated upon, nor does it interfere with aseptic healing.—*The Medical Dial*, 1899, vol. i. p. 280.

[The reports have been so generally favorable that it can safely be said that this remedy has obtained a secure position among the valuable resources of the ophthalmologist and laryngologist.—R. W. W.]

The Treatment of Aneurism with Gelatin Injection.—DR. A. FRAENKEL reports a single instance of aortic aneurism, the tumor situated beneath the sternum, at the angle of Ludwig. A 1 or 2 per cent. of sterilized gelatin solution in a 1 per cent. normal saline or soda solution was used for the purpose of increasing the coagulability of the blood. A relative cure—merely to prevent perforation—was expected. Twelve drachms of the above solution were injected under the skin of the abdomen, causing great pain. In all, ten injections were made, twice weekly, without disturbance, the pains becoming less. As results: The pulsation lessened and finally disappeared, the swelling disappeared, and the opening in the sternum grew smaller.—*Klinisch-therapeutische Wochenschrift*, 1899, No. 30, S. 978.

Treatment of Nervous Diseases.—DR. HARRY CAMPBELL does not find it necessary to use a large number of drugs, but urges understanding thoroughly a few. First and foremost comes potassium iodide, which, if syphilis be suspected, should be given in drachm doses, three or four times daily. An instance of the efficacious dose of this drug is cited, to which thirty grains of sodium salicylate had been added upon the suspicion that the headache might be rheumatic. Quinine, in ten-grain doses at bedtime, if any periodicity is manifested, should not be forgotten. Ammonium chloride is a valuable drug in neuralgia, particularly of the fifth nerve. Here, again, large doses are necessary. As a prescription: Ammonium chloride, thirty grains; tincture of gelsemium, seven and one-half minims; tincture of aconite, one minim; fluid extract of licorice, one drachm, with water sufficient to make an ounce, should be taken at the onset of pain and repeated every hour until three doses are taken. Lastly, the bromides are recommended, the base being chosen according to the patient. Often epileptics do well on strontium bromide. If the fits occur only at night, forty to sixty grains at bedtime may do better than divided doses during the day. Seven and one-half drops of the tincture of nux vomica will counteract its depressing effects. Strychnine should not be given in the same solutions with the bromide. All vicious habits should be carefully inquired into and corrected—tobacco, alcohol, tea. Peripheral irritations from the scalp, eyes, nasopharyngeal space, teeth, ears, digestive organs, and reproductive system must be sought out and their causative influence obviated.—*Treatment*, 1899, vol. iii. p. 337.

Methylene-blue.—DR. M. P. MICHAILOW, from laboratory research, concludes that the changes in tissues and organs of healthy animals under the influence of medicinal doses of this substance are distinct contraindications to its use in patients at the dose and for the time during which it is usually administered. In proof of this position he cites the vomiting, diarrhœa, and blue urine so frequently observed. The microscopical sections tend to support his contention.—*St. Petersburger medicinische Wochenschrift*, 1899, No. 23, S. 209.

Therapeutics: Past, Present and Future.—DR. GEORGE F. BUTLER calls attention to the employment of inductive methods of reasoning, characterizing the present century, in physiology, pathology, and medicine. As a result, the scientific habit of thought has been developed. Mention is made of the great progress in serum-therapy. The following is the author's definition of an antitoxin: it is "not the direct result of bacterial action, but is properly described as an unknown body, resulting from the resistance of healthy organisms to the toxins of pathogenic bacteria." Antitoxins, properly prepared, should be as harmless as blood-serum administered in the same way. They are used to resist the action of the toxins, and not as germicides; good culture media can be made from antitoxin serum. A theory of their action is that they neutralize the toxin, and the natural bactericidal powers of the body do the rest. Definite knowledge of the therapy of these sera is scanty. Experiments to prove that toxins are albumoses and antitoxins globulins are not conclusive. That a stimulation of the germicidal power of the body follows the administration of antitoxin seems logical, for streptococci rapidly disappear after the exhibition of antistreptococcic serum. Diphtheria bacilli remain present, however, long after antitoxin administration. High praise is awarded diphtheria antitoxin as a specific. One thousand units are recommended as an immunizing dose, and two thousand for all suspected patients. Good results from the use of diphtheria antitoxin in asthma, acute bronchitis, etc., may be explained by the natural immunity of the horse against these diseases, the favorable action being due to the blood-serum and not to its contained diphtheria antitoxin (McClintock). Antistreptococcic serum is praised more highly than recent reports seem to warrant. Special reference is made to its usefulness in erysipelas and puerperal septicæmia. Its value in destroying the "mixed infection" of phthisis is still undetermined. Tetanus antitoxin, though the results so far are not encouraging, is recommended *early* in the attack and in large doses. Chemical combination occurs between tetanus toxin and nerve tissue, with a resulting rapid destruction of the latter. It follows that, as tetanus antitoxin has no such chemical affinity, it neutralizes only the toxin remaining in the blood-current, and does not repair destroyed nerve tissue. Early diagnosis is indispensable to successful results. As a preventive the antitoxin is wholly satisfactory. In selecting an antitoxin the necessity of obtaining it from a reliable source is very strongly urged. Only that hermetically sealed is wholly safe from contamination. Foreign sera are not as satisfactory as domestic ones. Recent advances in pharmacology are also noted. Drugs at present assayed by the physiological method are ergot, cannabis indica, digitalis, strophanthus, convallaria, elaterium, and cocaine. It is strongly advised that no preparations of these drugs be given unless derived from stock of a known physiological strength.—*Medicine*, 1899, vol. v. p. 609.

Observations on Diphtheria; Cure by Douches of Sodium Phenate without Antitoxin Injections.—DR. ROULIN reports the results obtained in a patient thus treated. A little sulphate of quinine was given as an emetic, and the throat painted with a solution of sodium phenate (strength not stated). This was repeated hourly, day and night. The temperature declined in twelve hours, and the membranes diminished in extent. The following day there was a rise in temperature without apparent cause, and nasal irrigation was added to painting of the throat. Bacteriological examination showed a mixed infection of Löffler bacilli and staphylococci. The child (seven years old) soon learned to gargle, and this was substituted for painting the throat. Enlargement of the cervical glands rapidly disappeared, and the membrane in the throat was much diminished. A potion of quinquina was substituted for the sulphate of quinine. The patient made a rapid recovery. Another patient similarly treated did equally well. The author wishes to emphasize the fact that especially in diphtheria, with mixed infection, lavage of the throat with antiseptic solutions is to be prescribed in addition to the antitoxin treatment.—*Journal de Médecine de Paris,* 1899, vol. xi., No. 20, p. 201.

Ovarian Opotherapy.—DR. U. ARCANGELL has studied this subject with reference to chlorosis. He considers (1) that this method of treatment is harmful to chlorotics; (2) the results of this treatment show that the influence of the ovary upon the organism is of a chemical nature; (3) chlorosis is an ovarian intoxication caused by absent or incomplete menstrual depuration; (4) at present the only form of opotherapy which offers any prospect of success in chlorosis is the medullary; (5) organic iron preparations are always efficacious in chlorosis; (6) inorganic iron preparations are specific against ovarian intoxication; (7) at present the therapy of chlorosis consists of good feeding and Blaud's pills.—*La Riforma Medica,* 1899, No. 91, p. 185.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Calcium Carbide in the Treatment of Inoperable Carcinoma.—RIES (*Journal of the American Medical Association,* 1898, No. 29), referring to Etheridge's recommendation of this agent in carcinoma of the uterus, affirms that its action is identical with that of the ordinary caustic lime. He is inclined to attribute the beneficial effects rather to the preceding curettement than to the carbide of calcium, and cautions the profession against expecting any marked results from its use.

Periodical Delirium during Menstruation.—TRÉNEL (*Annales de Gynécologie,* 1898, No. 3) describes a peculiar form of delirium which recurs at the beginning of each menstrual period, the patient being entirely free from mental disturbance in the interval. It may assume the form of mania, melancholia, or hallucinations, usually begins suddenly and ceases as suddenly. It may appear at any age from puberty to the time of the climacteric. The prognosis is favorable (68 per cent. of the writer's patients having recovered), though it may become chronic and terminate in early dementia.

Cyst of a Supernumerary Ovary.—THUMIN (*Wiener klin. Wochenschrift*, 1898, No. 38) describes an interesting case of ovariotomy in a girl, aged twenty-two years, in whom the diagnosis of torsion of the pedicle had been made. The right tube and ovary were entirely normal, likewise the left ovary. The left tube was adherent to a simple serous cyst, the pedicle of which was twisted twice. An examination of the growth showed the presence of true ovarian tissue containing normal follicles, so that there could be no doubt that it developed from a true supernumerary ovary. Microscopically its structure indicated a transitional form between cystoma and cystoadenoma.

NEUMANN (*Archiv für Gynäkologie*, Band lviii., Heft 1) reports a case of dermoid cyst of a third ovary, with malignant degeneration of its wall. He regards the condition as perithelioma developing from the adventitia of the vessels or from the endothelial layer of the perivascular lymph-spaces. This, he believes, is allied to sarcoma rather than to carcinoma.

Transplantation of Ovaries.—MARCHESE (*Arch. Ital. di Gin.; Centralblatt für Gynäkologie*, 1899, No. 31) reports the result of a series of experiments in animals in which ovaries were removed and transplanted either to a distant site in the same animal (between the parietal peritoneum and psoas, between the fascia and rectus, or beneath the folds of the broad ligament) or to the pelvis of another animal. Rabbits survived the operation only a short time, but only one of the dogs operated upon died of peritonitis. The results varied greatly. While many of the ovaries were found to be nearly or quite normal after the lapse of several weeks (five months in one instance), in others more or less marked necrotic changes were observed, especially at the points of entrance of ligatures. In no instance was there any change in the general condition of the animals or any increase in adipose.

The writer infers that ovaries may be transplanted from one animal to another, or from their normal position to distant sites in the same animal, without impairment of their functions. In order to ensure integrity of a transplanted ovary it is important not to transfix it with sutures, but to attach it by means of a new pedicle, avoiding any possible compression from neighboring organs.

Ligation of the Uterine Arteries for Hemorrhage.—MANGIN (*Annales de Gyn. et d'Obstétrique*, 1899, No. 2) thinks that ligation of the uterine arteries is a simple operation, free from danger; it can be performed without anæsthesia. It is especially useful in cases of obstinate hemorrhage in which curettement is followed by negative results on account of the absence of disease of the endometrium. After ligation of the arteries in cases of uterine fibroid the hemorrhages nearly always cease, and the neoplasm often undergoes atrophy, provided that it is not situated in the lower uterine segment. Disease of the adnexa is the only contraindication to the operation.

Dermoid Tumor of a Third Ovary.—FRANZ (*Monatschrift für Geb. u. Gyn.*, Band viii., Heft 1) reports the case of a primipara, aged forty years, from whom he removed a dermoid cyst of the right ovary. Attached to the pedicle was a smaller intraligamentous dermoid, which was regarded as a development from an accessory ovary.

Glandular Hypertrophy of the Cervix Simulating Carcinoma.—DE SINÈTY (*Ibid.*) describes the following condition, to which Bouilly called attention: The patient, a multipara, aged thirty-two years, complained of abdominal pain with profuse leucorrhœa, but without any disturbances of menstruation. Examination through the speculum showed an irregular tumor the size of a hazelnut, which could be lifted from the subjacent tissue. On palpation it gave the impression of being cystic, and was found to consist of a number of cysts with limpid contents. The growth was of unusual size and might easily have been mistaken for a malignant neoplasm.

Metrorrhagia of Ovarian Origin.—BOUILLY (*La Gynécologie*, April, 1899) includes under this head hemorrhages which occur in connection with cystic or cirrhotic changes in the ovaries, where the uterine mucosa is apparently normal. The ovarian lesions are divided into three classes, viz.: Simple cystomata, small papillary cysts, and general sclero-cystic degenerations. Metrorrhagia, in connection with the first two conditions, is a symptom of secondary importance as compared with others due to the presence of the neoplasm. When associated with chronic changes in the ovary, without marked enlargement, the true cause of the profuse and prolonged flow is only inferred after repeated examinations and the failure of the ordinary methods of treatment. This form of metrorrhagia is confined to young women, usually nullipara, whose sterility in the absence of any discoverable uterine disease is inferred to be of ovarian origin. Curettement often shows that the endometrium is healthy. Although the flow may sometimes persist during almost the entire month, it shows a certain regularity in its recurrence, there being a clear interval between the periods, without the persistent sanguinolent discharge which is observed in cases of intra-uterine neoplasm.

Operation for Incontinence of Urine.—GONBAREFF (*Journ. d'Obstét. et de Gynécologie*, 1898, No. 6) reports the case of a virgin, eighteen years of age, who had been troubled with incontinence for ten years, due to a fall. Urine escaped constantly during locomotion or when the patient was recumbent. No local abnormality could be determined, and the urine was normal. Medical treatment being unavailing, the writer performed two separate operations (one of them being Gursuny's torsion method), without success. Believing that the meatus was situated too low down, he attempted to restore it to its proper position by a modification of Tait's operation. A transverse incision was made at the posterior border of the vestibule, the ends of which were extended upward on the anterior vaginal wall. The flap thus marked out was turned backward and a purse-string suture was passed through its free border and tied. The edges of the vertical wound thus formed were united, the result being to lift the opening of the urethra upward and permanently to relieve the incontinence.

Operation for Vesico-Uterine Fistula.—DRANITZINE (*Journ. russe. de Gynéc. et d'Obstétrique*, 1899, No. 9) speaks highly of an operation which consists in separating the bladder from the uterus, and closing the vesical and uterine openings separately, after which the wound in the anterior vaginal fornix is sutured. The advantages claimed for it are as follows: The entire field of operation is brought into view without the necessity of incising the cervix and everting its lips, as practised by Joubert; uretero-uterine fistulæ may be repaired in the same way, and an accompanying vesico-vaginal fistula may be closed at the same sitting; in all the reported cases the cure has been perfect and permanent, and no complications have occurred during or after operation. Two cases are reported by the writer.

Extirpation of the Uterus and Bladder.—MODLINSKY (*La Gynécologie*, April, 1899) reported at a meeting of the Moscow Surgical Society the following remarkable case: The patient, aged forty-five years, had been ill for a year and a half, having become much emaciated, with metrorrhagia, foul discharges, and vesical disturbances. The presence of carcinoma of the cervix was recognized, and an attempt was made to remove the uterus per vaginam. After the patient was anæsthetized it was found that the disease had invaded the vesico-vaginal septum, so that in irrigating the uterine cavity the bladder was opened. It was then decided to adopt the sacral route, and the uterus, adnexa and entire bladder were extirpated, the ureters being sutured to the vaginal vault. The patient made a good recovery, was entirely relieved of pain, and was free from recurrence at the time of writing. The patient was, of course, annoyed by the constant dribbling of urine, which the reporter hoped to be able to relieve by a subsequent plastic operation upon the vagina.

The Surgical Treatment of Retroflexion.—SIELSKI (*Centralblatt für Gynäkologie*, 1898, No. 33) insists that any method of correcting retroflexion which results in fixation of the uterus is based on erroneous ideas, as would be the permanent immobilization of a joint after reduction of a dislocation. The relief often experienced after the separation of adhesions, followed by ventro-fixation or vagino-fixation is due to the former rather than to the latter step in the operation; the symptoms are apt to recur in time, by reason of the impaired mobility of the uterus.

The axiom may be stated that operations which secure the greatest amount of mobility of the uterus are those which are followed by the fewest unpleasant after-symptoms.

Thrombosis of the Crural Veins after Operation.—LENNANDER (*Centralblatt für Chirurgie*, 1899, No. 19) calls attention to the occurrence of this complication after abdominal operations, especially in women, citing five cases of his own following appendectomy. He believes that it is usually due to retarding of the circulation from weak cardiac action added to prolonged rest in the recumbent posture after operation. Tympanites, which is such a common accompaniment of laparotomy, seems to increase the intra-abdominal pressure and, hence, to obstruct the circulation in the iliac veins, while the negative pressure in the thorax is diminished in consequence of the superficial inspirations. Changes in the vessel-walls, either pre-existing or of septic origin, constitute another factor.

It is remarkable that thrombosis seldom occurs after severe and complicated operations, which may be explained by the fact that drainage seems to regulate the disposition of the fluids remaining in the peritoneal cavity, while the frequent elevation of the foot of the bed favors the venous return. Hence the writer recommends the adoption of the latter practice as a prophylactic measure after every abdominal operation, and also after thrombosis has developed. In order to stimulate the heart's action and to increase the blood-pressure subcutaneous infusion of saline solution is recommended. Care should be observed not to compress the crural or saphenous veins by a tight bandage. When varices exist elastic bandages should be applied.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

The Extirpation of the Septic Puerperal Uterus.—PROCHOWNICK (*Monatschrift für Geburtshülfe und Gynäkologie*, 1889, Band ix., Heft 6) contributes a very interesting paper upon this subject. He draws attention to the fact that the mortality of the puerperal state has not been lessened as greatly as was hoped when antiseptic precautions began to be taken in labor. He estimates that in Germany from three to four thousand deaths occur yearly from puerperal septic infection, and from eight to ten thousand cases in which death does not occur, but in which the patient's health is more or less damaged. He has found the treatment by serum useless, and has given attention to the problem of finding out when the septic puerperal uterus should be extirpated.

It is evident that this serious procedure is justifiable only when it is positively known that the uterus is the site of the infection, when other means have been employed without result, and when the patient is evidently growing worse. He calls especial attention to the importance of studying each case during the first two days of the puerperal period without disturbing the patient by prolonged examinations. Each puerperal patient who has fever should be kept as quiet, as clean, and as comfortable as possible. The pulse, temperature, and respiration should be carefully recorded every four or six hours. Especial importance is attached to the condition of the pulse. The intestine should be emptied once in the most thorough manner possible. The patient should be once examined very carefully and thoroughly. If the pulse reaches 100, the heart, the lungs, and the spleen should be examined thoroughly, and the urine should be taken by catheter and subjected to examination, and the lower portion of the birth-canal should also be examined. Lacerations, either closed or without suture, and fissures in the perineum and vagina should be thoroughly examined. If no focus of infection is found, and the pulse does not exceed 100, no further examination of the birth-canal should be made.

When the patient's condition is serious and she has chills, high fever, a small and rapid pulse, the vagina should be douched with warm sterile water, and some of the lochial discharge should be taken from the cervix. A careful bimanual examination should also be made. These measures, however, can rarely be carried out satisfactorily in private practice, and it is evident that some other method giving positive information is very desirable.

For some time the writer has practised the regular examination in such cases by taking cultures of the blood. The region of the elbow and the forearm are antiseptically prepared, and with a sterile syringe 10 cm. of blood is taken from a vein, and a portion of it mixed with sterile bouillon, and the remainder placed in a sterile glass as soon as possible. Cultures are made from this blood and incubated, and in from twelve to twenty-four hours the results may be obtained. In his experience a fatal result has occurred in each case in which streptococci were evidently present in the blood. When, however, the blood was free from germs, all of the patients recovered but two, who perished from purulent peritonitis occasioned by streptococcus invasion through laceration in the vagina and cervix. When, however, it was impossible to remove suppurating decidua or pieces of placenta or moles, or when after labor myoma had become infected, and when the patient had a small and rapid pulse and distention of the uterus and abdomen, the cultures from the blood were positive and the cases demanded the removal of the uterus. Cases of incomplete abortion furnished many of these patients.

He also raises the question as to whether the removal of the uterus is not more appropriate in cases where rapid absorption of toxines is going on from the uterus rather than where virulent bacteria are found within the blood. While this query is difficult to answer, he draws attention to the fact that a negative culture from the blood in a severe case shows that typical pyæmia is not present, but does not make sure a favorable result. This method of examination is especially useful in preventing useless and harmful local interference. It especially justifies the absolute rest treatment employed in the first days of a septic case. When the cultures of the blood remain negative the uterus should be cleansed and douched with 50 per cent. alcohol, and should improvement not follow, its extirpation must then be seriously considered.

The writer sums up his experience by stating that he cannot decide upon extirpation of the uterus from the results of examination of matter taken from the vagina or uterus, but that he considers the examination of the blood of far more importance. If pyæmia is present, complicated with tumors in the pelvis, suppurating portions of the ovum or septic criminal abortion, extirpation of the uterus is not indicated, because it can rarely save the patient. If, however, it is evident that the uterus alone is pyæmic, and that these complications are not present, then the removal of the uterus may be followed by a good result.

Tubal and Abdominal Gestation.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, 1899, Band ix., Heft 6, occur two papers upon this subject.

The first is by BOTH, who describes tubal pregnancy upon the right side, which ruptured in the fifth month with considerable pain and shock to the patient. She continued, however, to improve, and abdominal section was delayed until the eighth month. On opening the abdomen the child lay among the intestines without an amniotic sac. The child was living, and survived delivery twenty hours. It was impossible to make a pedicle, and thus to remove the placenta immediately. The patient made a good recovery.

KREISCH reports from Martin's private hospital in Berlin five cases of tubal pregnancy, in which the diagnosis was made and the operation performed. The paper is interesting as illustrating the advantages of operating through the vaginal wall in these cases. In two of these patients it was possible to remove the tube and contents completely through the anterior wall of the vagina. Patients operated on in this manner made a more speedy convalescence and with less disturbance than those treated by abdominal section.

Puerperal Hyperpyrexia.—In the *Edinburgh Medical Journal*, June, 1899, LACKIE describes the case of a multipara delivered with forceps after severe birth pressure, who had an excessively high temperature, reaching on several occasions 110° F. A vesical vaginal fistula formed, with extensive sloughing. The patient was treated by free application of ice and by free stimulation. She finally made a complete recovery.

The case was thought to be one of supræmia, as evidences of septicæmia and pyæmia were not present.

Accidental Hemorrhage.—JARDINE, in the *Scottish Medical and Surgical Journal*, June, 1899, describes the case of a multipara, seven months pregnant, who had profuse hemorrhage, following straining in emptying the bowel. As the os was fully dilated, the membranes were ruptured and the child delivered by forceps. Firm pressure over the uterus expelled several large black clots and the placenta, which had been completely separated. Post-partum bleeding was checked by a hot douche, and, under ergotine and ether, with the injection of saline fluid, the patient recovered.

He also reports the case of a woman having a contracted pelvis, in whom labor was induced. During the course of the labor a de Ribe's bag was introduced to dilate the os, and was filled with carbolic solution pumped in through a compression syringe.

The patient suddenly became white and the pulse grew very weak. Blood-stained fluid was at once discharged. When the bag was withdrawn it was found to have a rent nearly an inch long in its side. The patient was at once delivered by version of a living child. Secondary hemorrhage from a torn cervix caused her death. The bursting of the bag had caused separation of the placenta, which was fatty, followed by fatal hemorrhage.

On examination, the bag was found to have been made of some preparation of rubber. Some of these bags are made of silk, and might possibly be stronger. The case illustrates one of the dangers of induced labor.

In general, in premature separation of the placenta, Jardine advises delivery as soon as possible. He calls attention to severe pain in the womb, which is often present, and also to the fact that at times the womb in these cases is soft and relaxed, and at other times firm and tense.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

J. SOLIS-COHEN, M.D.,
OF PHILADELPHIA.

Stenosis of the Œsophagus.—I. *Diverticulum of the œsophagus due to an intrathoracic colloid struma.* This case is reported by H. Starck (*Berlin. klin. Wochenschrift*, 36 Jahrg., No. 25; *Philadelphia Medical Journal*, October 21, 1899), who utilized the gastrodiaphane and the Röntgen ray in making the diagnosis. The patient died of voluntary starvation, and a huge tumor the size of two fists was found covered by the upper and middle lobes of the right lung. The diverticulum, as big as a fist, projected from the posterior wall of the pharynx, and the œsophagus was reduced to a tube scarcely the thickness of a lead-pencil.

II. *Spindle-form enlargement of the œsophagus.* This case is reported by Dr. Schwörer (*Münch. med. Wochenschrift*, 46 Jahrg., No. 25; *Philadelphia Medical Journal*, October 21, 1899), and occurred in a railroad conductor, aged fifty years, who for thirteen years had at times difficulty in swallowing, more marked after excitement, showing the stenosis to be in part spasmodic. The spindle-form of the dilatation of the œsophagus was verified by the use of a bismuth injection and the Röntgen rays.

Foreign Body in the Œsophagus.—Dr. G. G. Eitel, of Minneapolis, Minn., reports (*Medical News*, September 16, 1899) an external œsophagotomy for the extraction of a tooth-plate which had been impacted in the œsophagus for six years and four months. The patient is in good health nearly six years after the operation.

Folliculous Pharyngitis.—Tumefactions of the pharynx, indicating what is popularly known as folliculous pharyngitis, are really due to lymphoid nodules in the mucous membrane. Prof. v. Grazzi, of Florence (*Annales des Mal. de l'Oreille, du Larynx*, etc., October, 1899) claims to be able to secure their absorption by compression from above downward with a metallic roller. He has found this method, during two years' practice, of special advantage in the treatment of chronic catarrhs of the middle ear.

Amygdalitis.—Treatment of follicular and suppurative amygdalitis and the angina of scarlet fever by the injection of a solution of carbolic acid, varying from 1 per cent. to 4 per cent. in strength, is strongly commended by DR. H. JUDSON LIPES (*New York Medical Journal*, October 21, 1899) as the result of treatment in nineteen cases. All but two cases were among children from eight months to fifteen years of age.

Cysts of the Tonsils.—MONNIER (*Archives Internat. de Laryng.*, May and June, 1899; *Annales des Maladies de l'Oreille, du Larynx*, etc., October, 1899) calls attention to cysts of the tonsils, with caseous contents of varying grades of protrusion, occurring without any inflammatory reaction. The contents of these cysts are aseptic. The condition is sometimes mistaken for that of malignant degeneration. Simple incisions of the pouch, its curettage, and the cauterization or removal of the cystic portion assure complete cure.

Peritonsillar Abscess Associated with Diphtheria.—DR. THOMAS HUBBARD reports (*New York Medical Journal*, October 14, 1899) two cases. Case one was a farmer, aged thirty years. On the fifth day of an acute amygdalitis his right tonsil was incised, with evacuation of some pus, and on the next day the two tonsils and the pharynx were found to be covered with false membrane. Despite 3500 units of diphtheria antitoxin in divided injections, the membrane rapidly invaded the rhinopharynx, nares, and larynx. Laryngeal stridor soon necessitated tracheotomy, which was performed after the patient was apparently lifeless; but artificial respiration for fifteen minutes, with the tracheal dilator in place, restored the action of heart and lungs. The patient died eighteen hours later, the immediate cause being, apparently, pulmonary œdema. The trachea was in the same condition as the throat, decidedly œdematous and covered with diphtheritic membrane.

The second case occurred in a family of a number of children, six of whom were sick with sore-throat, or with amygdalitis, or with undoubted diphtheria.

Pendent Growths of the Tonsil.—Two cases of polypoid hypertrophy of the tonsil are reported by DR. V. TEXIER (*Annales des Mal. de l'Oreille, du Larynx*, etc., October, 1899, illustrated), and their histological characteristics are described and illustrated. They were of the type of lympho-angiomatous rather than fibroid angiomatous growths.

An analysis in the same journal records a case of pendent tonsil reported by PAUL REINHARD (*Wien. klin. Wochenschrift*, 1899, p. 373).

Accessory Thyroid-gland Tumors in the Base of the Tongue.—Tumors in the base of the tongue, due to enlargements of accessory thyroid glands, have been recognized only in the last decade or so, probably because they were formerly classed among fibroids, owing to lack of accurate microscopical investigation. About fifteen cases comprise the entire record, all but one having occurred in female subjects.

Dr. Arthur W. Watson, of Philadelphia, reported two cases, one of them in a colored girl, at the last meeting of the American Laryngological Association (*New York Medical Journal*, October 21, 1899, illustrated), and Dr. J. E. Schadle, of St. Paul, Minn., reported two cases to the Section of Laryngology and Otology at the last meeting of the American Medical Association (*Journal of the American Medical Association*, October 21, 1899, illustrated).

In Dr. Watson's cases the growths were removed with the electric incandescent snare. In Dr. Schadle's cases one growth was removed by external access through the floor of the mouth, while the second patient declined an operation.

Thyroid-gland Metastasis in the Nasal Cavity.—L. Harmer reports (*Philadelphia Medical Journal*, October 21, 1899; *Wien. klin. Wochenschrift*, Jahrg. 12, No. 23) a case of carcinoma of the cervical glands in which metastasis took place to the base of the brain, with involvement of the optic muscles and nerves, and penetration into the posterior nares. It was the tumor in this region that was first noted and which led to the investigation which resulted in the detection of the general involvement.

DERMATOLOGY.

UNDER THE CHARGE OF

LOUIS A. DUHRING, M.D.,

PROFESSOR OF DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA,

AND

MILTON B. HARTZELL, M.D.,

INSTRUCTOR IN DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

Finsen's Phototherapy.—Bie (*Philadelphia Medical Journal*, October 7, 1899) describes at some length the methods employed and the results obtained by Finsen in the treatment of lupus vulgaris and some other affections by means of concentrated light. About three hundred and fifty cases of lupus vulgaris have been treated with this agent. In the milder cases the light is employed alone; in the more severe ones the light-treatment is supplemented by treatment with an ointment of pyrogallic acid. The pyrogallic acid is first applied, and when the cauterization is healed this area is subjected to light. Ulcerations are freed from crusts by cataplasms of boric-acid solution. A solution of iodine and potassium iodide is applied to the lesions on the mucous membranes, or the galvano-cautery is used. Only disease of the skin, hard palate, the front part of the nasal septum, tongue, and mucous membrane of the cheek can be healed by the treatment by light. In all the 350 cases the improvement has been so certain and constant that there is reason to doubt the diagnosis when this treatment is ineffective. In many cases of lupus erythematosus, phototherapy has produced permanent recovery; but the effect of this treatment in this malady is not nearly so certain as in lupus vulgaris. Seven cases of alopecia areata have likewise been cured by this method of treatment. Later experiments seem to demonstrate the curability of even old cases, but only after long treatment. The results of these experiments are regarded as supporting the theory of the infectious origin of alopecia areata.

The Lesion of Molluscum Contagiosum.—AUDRY (*Annales de Dermatologie et de Syphiligraphie*, 1899, No. 7) believes that molluscum contagiosum is a lesion of the epidermis. The absence of any connection with the hairs, the impossibility of finding any trace of a sebaceous process, the character of the surrounding connective tissue, are so many arguments against the adoption of the follicular or sebaceous origin of the affection. The nodule is not a neoplasm in the proper sense; it is a specific metaplasia peculiar to this affection. The author, while believing that the malady is a parasitic one, does not accept the views of Bollinger and Neisser, but thinks the parasite has not yet been discovered.

Treatment of Ungual Trichophytosis.—JOHNSTON (*Journal of Cutaneous and Genito-urinary Diseases*, September, 1899), at a meeting of the New York Dermatological Society, reported a case of trichophytosis of the nails (the diagnosis having been verified by the microscope), in which remarkable therapeutic results were obtained by the use of iodine dissolved in a saturated solution of potassium iodide. Under applications of this solution the disease disappeared entirely, on one hand, and was greatly improved on the other, after three or four months.

Treatment of a Case of Leprosy by Hypodermatic Injections of Chaulmoogra Oil.—TOURTOULIS-BEY (*Annales de Dermatologie et de Syphiligraphie*, 1899, No. 7) reports a case of leprosy greatly improved by chaulmoogra oil administered hypodermatically. The patient, who was a native of Upper Egypt, presented well-marked symptoms of the disease, which was of the mixed variety and began at fifteen years of age. Chaulmoogra oil was at first prescribed in thirty to fifty drop doses by the mouth. At the end of two months there was decided improvement, but the patient was obliged to give up the oil because of the nausea and vomiting it produced. Later it was again tried, but had again to be abandoned as before. Hypodermatic injections were now used, and after fifty injections of five grammes each the lesions began to undergo retrogression. After six years of this treatment the patient was practically well.

Two Epidemics of Alopecia Areata in an Asylum for Girls.—BOWEN (*Journal of Cutaneous and Genito-urinary Diseases*, September, 1899) reports two epidemics of alopecia areata in an institution for homeless girls between the ages of three and fourteen years. The first case occurred in a girl, eleven years old, who when first seen presented three round, bald patches upon the crown of the head, clinically typical of alopecia areata. Several weeks later another girl was found to have a bald patch upon the crown, which increased rapidly in size for a time. Four months after the discovery of the first case a large number of the girls in the asylum were suddenly found to be affected. After cutting the hair of all the children it was found that sixty-three of the sixty-nine girls had bald areas upon the scalp. One girl, who had just entered the institution, acquired a patch in three days. After two months the disease appeared to come to a standstill; at the end of six months almost all the bald patches were covered with hair. No trace of micro-organism was found. No adult inmate of the asylum was attacked. Six years after this epidemic the first patient, having been absent from the asylum for three years, was readmitted. A month or six weeks afterward one of the children was discovered to have a bald patch, and four or five months later twenty-six of forty-five children were affected in a similar manner.

A Vesicular Eruption Cured by Circumcision.—BULKLEY (*Journal of Cutaneous and Genito-urinary Diseases*, October, 1899; *Transactions of the New York Dermatological Society*) reports a case of troublesome vesicular eruption occurring in a child, four months of age, for which no other cause could be found but a long and adherent prepuce. The eruption was regarded as a reflex herpes, and circumcision was advised, without any other treatment. Three weeks after the performance of circumcision the eruption had completely disappeared, having previously lasted four months and having resisted all local treatment.

Keloid Treated by Electrolysis.—CROCKER (*British Journal of Dermatology*, July, 1899) exhibited before the Dermatological Society of Great Britain and Ireland a female patient with keloid between the scapulæ, which had followed a burn five months previously. The growth was very prominent, of a bright red color, and was accompanied by much itching and slight pain. After the employment of electrolysis at four sittings a fortnight apart the growth was much shrunken and paler, and the itching and discomfort disappeared. The needle was inserted for a minute at a time, the punctures being about one-quarter of an inch apart, and the current strength used was about five milliampères.

Value of Arsenic in Dermatitis Herpetiformis.—A physician residing in India (*British Journal of Dermatology*, July, 1899), gives his personal experience, extending over several years, with this disease, and points out the striking amelioration of the disease during attacks of malarial fever and other intercurrent disorders, and the benefit derived from the use of arsenic in full doses.

Kakodylate of Sodium in Psoriasis.—NEUMANN (*Archiv für Dermatologie und Syphilis*, Band xlix., Heft 1), at a séance of the Vienna Dermatological Society, exhibited two patients with psoriasis who had been treated by injections of kakodylate of sodium. The first patient, a girl, nineteen years old, who had not been treated before her entrance into the hospital, received at first injections of a solution 2 : 20; later the strength of the solution was increased to 4 : 20 and then to 6 : 20. After twenty injections the eruption, which was a very extensive one, began to undergo involution, and after thirty the scales fell off, leaving smooth, red spots. Although the amount of kakodylate of sodium given contained about ten grammes of arsenic, no unfavorable effects were produced. The second patient was also a young woman, twenty years of age, with an extensive eruption. She received daily injections of a 20 per cent. solution.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF
W. T. COUNCILMAN, M.D.,
SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY,
AND
F. B. MALLORY, M.D.,
ASSISTANT PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY.

Metastatic Embryonal Glandular Tumors in the Region of the Kidney in Children.—ENGELKEN (*Beiträge zur path. Anat. und zur allg. Path.*, 1899, xxvi. p. 320) reports a renal tumor in a four-year-old girl, which was diagnosticated as sarcoma of the liver. The latter organ was apparently enlarged, and presented two large nodular growths on the upper anterior surface. The lower third of the kidney projected from the kidney mass, which had grown upward into the vena cavæ and extended into the cavity of the right auricle. There were many metastases in the liver and peritoneum, and one nodule in the right lung.

The tumor consisted of sarcoma-like cells, with connective tissue and blood-vessels, smooth muscle fibres, and gland-like structures, with alveolar formations, as well as actual lumina, lined by one or more layers of cuboidal or cylindrical cells. The lumina appeared to be in the oldest parts of the tumor, while the rest seemed embryonal. The metastases showed the same structure as the tumor, and arose from the sarcoma-like or parenchymatous cells.

Hemorrhages were noticed in places, due to congestion and to thrombosis. Necrosis followed the diminution of blood supply, and when old showed areas of blood pigment. No glycogen or fat was observed. Peritoneal metastases came from rupture of the capsule of the liver tumor and lung metastases from the blood. The retroperitoneal lymph nodes showed no metastases.

Twenty-eight cases of similar embryonal tumors were collected, tabulated, and divided into three groups: First, those with sarcoma-like masses, epithelial gland-like structures, and smooth muscle fibres; second, those with striated muscles as well; and, third, those containing other tissues, such as cartilage. In most of these cases the kidney tissue was not preserved, hence he concludes that the embryonic anlage of the kidney was involved as well as the Wolffian body. If the latter did not undergo complete regressive changes a tumor might develop, but this is rare. Striated muscle and cartilage might possibly come from the vertebral plate, while smooth muscle might undergo metaplasia into striated fibres.

Hydrocephalus and Hypoplasia of the Suprarenals.—Czerny (*Centralbl. f. allg. Path. u. path. Anat.*, 1899, Band x., No. 7, Plate I.) has studied the adrenal glands from five children with hydrocephalus and from twenty children with normal glands. Macroscopically there was no difference, but microscopically the glands from hydrocephalus cases showed an atrophy of the medulla, even to its complete disappearance. In such cases the inner surfaces of the cortex were separated merely by the central veins.

To discover any possible connection between the cerebral ventricles and the adrenals he injected Berlin blue into the ventricles of young white rats. The pigment appeared first in a lymph vessel, which gave off a twig to the adrenals and then passed on to the pelvis. Similar experiments on narcotized dogs and cats were negative, due, Czerny thinks, to the fluid rapidly entering the veins and becoming diffusely spread.

The changes observed in the glands of children were on both sides and equal. No regressive metamorphoses or remains of such were noticed; hence, Czerny thinks the changes were developmental anomalies.

Cell Inclusions in Carcinomata and their Relation to the Blastomycetes.—C. Sternberg's (*Beiträge zur path. Anat. und zur allg. Path.*, 1899, xxv. 554) conclusion is that the study of this question has added much to our knowledge of cell-structure, but has added nothing to our knowledge of the etiology of malignant tumors.

In reviewing the literature he finds that the demonstration of these structures rests chiefly on their morphology and their reaction to stains. Certain so-called "specific stains" have been devised by Sanfelice and modified by Roncali, Aievoli, Secchi and others. After trying several of these he secured the best results with that of Aievoli. This he finds is an unimportant modification of Gram's method, as also a number of the other "specific stains." Control specimens stained by Gram's method give practically the same results.

He investigated first an adenocarcinoma of the ovary, which, in portions of the tumor, had the structure of carcinoma simplex. Metastases occurred in the liver, kidney, and spongiosa of the bones. In the latter position they had an osteoplastic nature. Sections, especially from the non-glandular portions of the tumor and its metastases, stained simply with hæmatoxylin and eosin showed the following structures in the tumor cell:

(*a*) Unstained areas, occasionally containing variously-formed structures staining intensely blue.

(*b*) Structures of various forms staining pale blue, homogeneously or irregularly.

(*c*) Pale-blue structures with a double contour.

(*d*) Pale-blue structures surrounded by an area staining with eosin.

(*e*) Structures staining deeply with eosin.

In general the same structures were shown by Gram's method. The structures classed under (*b*) remained unstained or pale, those under (*d*) unstained, and many of those under (*e*), in the cells, vessels, and other tissues, stained bluish-black. Treated by Van Gieson's method the structures classed under (*b*) stained red and those under (*d*) stained blue.

From these results he draws the following conclusions: Structures classed under

(*a*) Represent vacuoles, occasionally containing one or more leucocytes.
(*b*) Probably represent stages of mucoid degeneration.
(*c*) Represent areas of calcification.
(*d*) and (*e*) represent white and red blood-corpuscles.

In a carcinoma of the breast the same results were obtained.

In epitheliomata he found all the intermediate stages between portions of the tissue staining by Gram's method and the structures regarded as cell inclusions. The normal stratum corneum and the keratinized tumor cells stained blue, leading in some cases to the production of peculiar figures that might be mistaken for parasites. Control specimens stained by ordinary methods, however, showed that they were due to keratinization in the cells. The muscle bundles retained the stain and in many cases were surrounded by a clear space, which might be mistaken for a capsule. A few of the nuclei of the leucocytes and of the carcinoma cells also retained the stain. Intranuclear structures corresponded to nucleoli. The kerato-hyaline granules of the stratum granulosum, the root-sheaths of hairs, hyaline, and colloid, were not decolorized by Gram's method.

Referring to the plates in the work of Binaghi he finds that the structures represented in Figs. 1 and 3 correspond to the cells here described as being in a state of mucoid degeneration; the structures in Fig. 2 he recognizes as stained red blood-corpuscles, those in Figs. 4 and 7 as keratinized cells and cell groups. He finds nothing satisfactory in the literature concerning the chemical and inoculation tests.

The Experimental Production of Cancer.—LACK (*Journal of Pathology and Bacteriology*, 1899, vi., 154) claims that he has produced cancer experimentally. He holds that carcinoma is simply the result of the entrance of the normal epithelium of the body into the lymph-spaces and its continued growth therein. To test this view he operated upon two rabbits. The ovaries were cut open and the raw surfaces scraped freely with the edge of the knife. The milky juice containing free epithelial cells was carefully allowed to diffuse through the peritoneal cavity. One of the animals died within forty-eight hours, the other remained well for nearly a year. Then it became gradually weaker and thinner, and was killed. Numerous white, hard nodules were found in the mesentery. The liver was greatly enlarged, and contained many cysts; thickly scattered through it were numerous small white patches, densely hard on section. The diaphragm was infiltrated with dense whitish tissue, and the parietal pleura, lungs, and uterus contained nodules similar in appearance to those in the mesentery. Microscopically they were shown to consist of alveolar spaces lined by one or more layers of columnar epithelial cells. The tumors had all the characteristics of an ovarian cancer.

As is well known, diffuse cancer of the peritoneum has followed removal of ovarian cysts. The fluid in these cysts contains free epithelial cells, and the explanation universally given, that in cases where this dissemination of malignant disease has occurred the original cysts were malignant, is in the writer's opinion not always the true one.

[Although cancer in rabbits is extremely rare, if it occur at all, a solitary case like this, no matter how convincing, must be viewed with suspicion until mere coincidence is ruled out by further experiments.—Ed.]

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF
CHARLES HARRINGTON, M.D.,
ASSISTANT PROFESSOR OF HYGIENE, HARVARD MEDICAL SCHOOL,
AND
EDWARD F. WILLOUGHBY, M.D.,
OF LONDON.

Oil as a Preservative of Meats.—Oil is used in the household in various parts of Italy for keeping meat fresh, and it has been used extensively for ages in preserving wines; but it has long been known that access of air is not thereby wholly prevented, and it has been proved that even the evaporation of water beneath it can proceed to some slight extent. To determine the preservative influence of oil, Dr. Constantine X. Hieroclès (*Archiv für Hygiene*, xxxiii., 155) made a series of experiments. He found that parts of a piece of ordinary beef placed in flasks, covered with oil to a depth of 3 cm. and kept at 7° C., at room temperature, and at 28° C. showed bacterial growth of, respectively, 1845, 2572 and 2950 times the number originally present. Then pieces of sterile meat of various kinds were kept under the same conditions, but in all cases growth appeared after a time, though much of it originated in the oil itself, even though this had been exposed to 100° C. for half an hour. To determine the inhibiting action of oil on bacterial growth he took two fresh agar cultures of each of the following: proteus vulgaris, B. subtilis, B. megaterium and B. anthracis, and to one of each pair he added oil up to the cotton stopper. All eight tubes were kept at 28° C. It was soon demonstrated that the growths under the oil were much less active than the others. He points out that in warm climates the method may be of advantage, since it does not interfere with bacterial multiplication and protects the meat from contamination through contact of insects. Moreover, the outer portions are not dried up, and the whole can be used.

Bedbugs and Fleas as Agents in the Spread of Disease.—More or less evidence has been adduced from time to time to show that bedbugs, fleas, and other insects act as carriers of disease germs. Cases have been reported by Carmichael showing a connection between bedbugs and leprosy, and by Craig, connecting this bug with tuberculosis and cancer. The flea, having been observed on rats dying of the plague, is supposed by Simond and Yersin to play a part in the spread of that disease. Now comes a series of carefully conducted experiments by DR. GEORGE H. F. NUTTALL (*Centralblatt für Bakteriologie*, Abth. I., xxiii., No. 15), in which bedbugs and fleas were given the opportunity to transfer anthrax, chicken cholera, and mouse septicæmia. He obtained some bedbugs and allowed them to suck the blood of diseased and dead mice, and then transferred them to healthy mice. Fleas found on diseased mice were similarly transferred. In other experiments the insects were placed upon healthy mice from which the hair had been shaved in spots whereon anthrax matters were painted. Although individual animals were bitten by as many as twenty-nine bedbugs and eight fleas, the results were all negative. Inoculations with the viscera of the bedbugs, however, were uniformly successful, even when considerable time had been allowed to elapse. With anthrax and chicken cholera, infection occurred after four days, and with mouse septicæmia after six. Their excreta also were infective. Infection with the organs of the fleas was unsuccessful eight hours after removal. Nuttall concludes that when these insects bite they remove any transferred organisms immediately by sucking, but that infection can occur when the person being bitten slaps and crushes the insect and then scratches the spot.

Action of Soil on the Plague Bacillus.—DR. Z. YOKOTE (*Centralblatt für Bakteriologie*, Abth. I., xxiii., No. 24) took mice that had died of infection with plague bacilli placed them in wooden boxes, and buried them in garden soil which was kept from thorough drying. The boxes were exhumed from time to time and the contents examined to ascertain if infective material still existed. The longest time that elapsed between the burying and the demonstration of the still virulent organism was thirty days, and the higher the temperature and the more active the rate of decomposition the shorter the life of the organism. The soil in the immediate vicinity of the boxes was examined for the organisms, but the results were negative.

Concerning the Use of Meat from Diseased Animals.—DR. FRITZ BASENAU (*Archiv für Hygiene*, xxxii., 219) makes some recommendations which may have some economic importance. A certain group of diseases seems especially liable to render meat injurious, but an animal slaughtered on account of sickness is not necessarily unfit for food, especially if the food be not eaten raw. Ordinary macroscopic examination will not show whether any infection resides in the meat itself, but bacteriological and feeding experiments will determine whether it may be used. He recommends that in case an animal is slaughtered while sick and it is desired to use the flesh as food, the bacteriological examination be begun within twenty-four hours, during which interval any organisms present will probably multiply. In healthy animals no bacteria are found within the muscles even after long keeping. At the time of starting the bacteriological examination feeding experiments should be begun also, mice being fed upon the raw meat, and others with meat that has been kept at the temperature of boiling water for an hour. If no colonies are observed in twenty-four hours, and no bacteria are demonstrated by the microscope, the meat is good. If colonies are produced, reliance must then be placed on the feeding experiments. If the mice fed on raw meat die and the others survive, the inference is that the meat may be cooked and eaten; if both sets die, the meat may not be used as food. Basenau examined the meat of a number of cattle that had suffered from various septic processes, and found it to be more or less rich in bacteria. The diseases included chronic pyæmia, septicæmia cryptogenetica, abscessus lienis traumaticus, paralytic puerperal fever, and perforation peritonitis. The bacteria found approach closely his *bacillus bovis morbificans*, but with some differences. All killed mice used in feeding experiments quickly and surely. Some produced poisonous matters which could withstand even the boiling temperature. In all probability these bacteria are pathogenic to man, for they resemble or are identical with the bacteria which have been isolated as the exciting cause in different outbreaks of meat-poisoning.

Dr. Lardier (*Revue d'Hygiène*, 1898, 431) instances a case in which a cow dead of anthrax was eaten by a large number of people without the slightest ill effects. Not so fortunate, however, were those who handled the carcass, which was the cause of a series of fatalities. Two men who helped skin the animal had typical charbon, but recovered. A calf belonging to one of them was seized with the disease and died, and in the removal of its hide another man was pricked, and, in consequence, died. The head of the cow was sold to a woman, who wounded herself in cutting it up, and died. The skin of the cow was sold to a man who stored it in a shed on his farm, and a few days later one of his cows dying of the disease, a post-mortem examination was made, and in the process the operator wounded himself, and died. In addition, from seven to ten cats that ate of the refuse and blood of the original cow all died suddenly shortly afterward.

Zinc as a Normal Constituent of Drinking-water.—Carl Th. Morner (*Upsala Läkarefören*, 1898, iii., through *Hygienische Rundschau*) examined the water of a well in the country near Upsala, which, in spite of a peculiar taste, had been in daily use for a year. Analysis showed traces of iron and no less than 8 milligrammes of zinc to the litre present as a carbonate. No disturbance whatever of the health of any of the persons who had been using the water constantly during the year had occurred.

[This case adds to the evidence against the cumulative action of zinc. Two wells which yield water containing notable amounts of zinc are known to have been in constant use, one of them as the sole public well of a small German town, for more than a century, without, as far as known, causing any disturbance of health. There are several springs in the southern part of Missouri which contain very much larger amounts of zinc than any of the above mentioned.—C. H.]

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are received only *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

Dr. Alfred Stengel, 1811 Spruce Street, Philadelphia, U. S. A.
Or
Dr. Hector Mackenzie, 59 Welbeck St., Cavendish Sq., London, W., Eng.

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

MARCH, 1900.

GANGRENOUS DERMATITIS COMPLICATING TYPHOID FEVER.

BY B. FRANKLIN STAHL, B.S., M.D.,
VISITING PHYSICIAN TO ST. AGNES' HOSPITAL; LECTURER ON DIETETICS OF THE SICK, AND INSTRUCTOR IN PHYSICAL DIAGNOSIS, UNIVERSITY OF PENNSYLVANIA.

THERE were treated in the medical wards of St. Agnes' Hospital during August, September, and October, 1898, the period of my service at the hospital, 413 soldiers. Of this number 144 developed or had when admitted typhoid fever, and 10 of these patients presented, in varying degrees of severity, that rarest of all the complications of typhoid fever, namely, gangrenous dermatitis. I published a preliminary report of these cases in the *Philadelphia Medical Journal*, October 15, 1898, and in the issue of January 25, 1899, I reported the experiences in the treatment of the entire series of cases of typhoid fever. In this communication I desire to report ten cases of gangrenous dermatitis, supplemented with photographs which more or less clearly portray the location, extent, and in two instances the progress of the disease.

Most of the text-books fail to mention the condition as a possible complication of typhoid, and Hare in his recent work, *Medical Complications and Sequelæ of Typhoid Fever*, while giving an illustration of a case of gangrenous dermatitis that occurred in his wards, and showing two plates of the cases here reported, dismisses the subject with nineteen lines of the text.

ETIOLOGY. The etiology of this condition, aside from the bacteriological finding, is of interest because of the associated grave anæmia, the development of the condition at a time when the patient had passed through a period of the greatest severity of the fever, the almost absent or exceedingly feeble first sound of the heart in five of these cases; the occurrence of mitral regurgitation in two of the cases; the cyanosis of the skin of the extremities that preceded the necrosis in one instance, and the hyperæmia of the face in another instance; the blurring of the muscular sound of the heart and the accentuation of the second sound; the arterio-sclerosis of most pronounced type in a patient of nineteen years, and its presence in a pronounced degree in a large percentage of the entire series of cases of typhoid fever in men, most of whom were under twenty-five years of age; the oval shape of several of the areas, and the subsequent development of phlegmasia, all lend weight to the assumption that the disease is of embolic or thrombotic origin. The post-mortem findings—ecchymotic areas in the stomach, and infarction in the upper lobes of both lungs in one instance, and in the left kidney of the same case, and in the other instance that came to autopsy there was infarction of both kidneys and the spleen—all these facts point to the one exciting cause.

It would have added interest to the search for a remote exciting cause had all of the patients exhibiting the disease come from the same camp; but such was not the case. Neither had the trouble confined itself to the patients in one ward or one floor of the hospital, nor to those under the care of any set of nurses.

BACTERIOLOGICAL EXAMINATION. The bacteriological examination of these cases was made by Dr. James Walsh, bacteriologist to the hospital, and was as follows:

Two inoculations were taken from the unbroken vesicles, one on agar-agar and the other on egg albumen, showed cultures of staphylococcus pyogenes albus and aureus, no other bacteria being found. These were grown on the different media and put through the different tests that would prove their identity.

A culture from an ulcer after the vesicle had broken down showed the staphylococcus pyogenes albus and aureus in large numbers, and, in addition, large numbers of several indifferent bacteria, as cocci, diplococci, etc., were found.

The inoculability of the disease is evidenced by the experience of one of the nurses. A swab used in cleansing one of the gangrenous patches came in contact with a place on her hand where the skin was broken, and she promptly developed a sore which yielded cultures identical to those secured from the gangrenous area.

THE FREQUENCY OF THE OCCURRENCE. Dr. W. W. Keen, in the Shattuck Lecture delivered June 6, 1896, says: "While gangrene is an important complication or sequel of typhoid, it is, fortunately, rare, so that most practitioners, even men of vast experience in large hospitals, have never seen a case; for example, Flint and Murchison. Holscher, in 2000 fatal cases of typhoid, does not report a single case though he records 59 cases of thrombosis of the femoral vein, and Bettke in 1420 cases, found only four cases of gangrene, all limited to the toes."

THE DISTRIBUTION OF THE LESIONS. My experience in the distribution of the lesions of the disease is in marked contrast with that of those who have reported cases. The exemption of the extremities, with one exception, is worthy of especial consideration.

In the cases reported the trunk was the most frequent seat of the disease, and the face, the arms, the thighs, and, in two instances that terminated in death, the scrotum were involved. In only one case did the disease attack the foot, and while the patient survived the foot was lost.

The treatment of these necrotic areas consisted in cleansing them and applying acetanilid and bovinine. Internally, they were given whiskey, strychnine, and a preparation of iron.

MORTALITY. Three of the ten cases died, and in two instances autopsies were held.

CASE I. (Hospital No. 1159, and No. 1 in this series).—S. M., aged twenty-two years. Camp at Fernandina, Fla. Patient walked aboard the hospital train, carrying the weight of his equipment, with the exception of his gun. The temperature was 105° F. at this time, and three hours later it was 106.4° F. The temperature continued between 104° and 105° F. for four days, and then ranged about 103° F. and over. His mind was cloudy at the time when there was not positive delirium, so that no history of his illness could be obtained. The spleen was enlarged, but no spots were present. One week after admission spots appeared, and the mind had cleared. The muscular sound of the heart was very deficient. The temperature was fluctuating between 100° and 103° F. He had a chill, and the temperature rose to 107° F. on the ninth day after admission; the respirations were from 40 to 52; there were crepitant râles at the lower lobe of the right lung, and the muscular sound of the heart was absent, and the second sound followed very quickly upon the first.

At this time there was noted a bed-sore and numerous boils.

On the tenth day the following note was made: On the right side, seventh interspace back of the anterior axillary line, a small furuncle appeared last night. Its greatest diameter was one-half inch. This morning there is necrosis of the integument, two by two and one-half inches. Underlying skin appears necrosed, with a central zone of darker color. Two inches below this, and more posterior, is a "sore" similar in character to that noted as present last night. It has a diameter of three-eighths of an inch. There is ecchymosis of the skin around the necrotic areas.

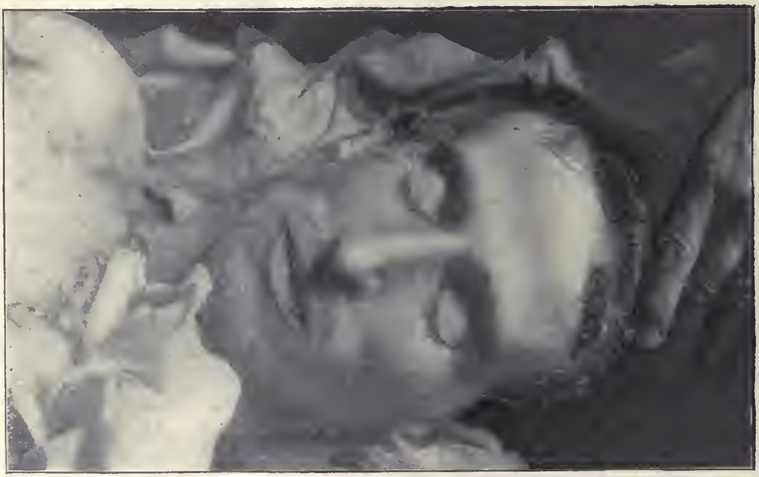
Eleventh day. Has abscess on inner side of left arm, one-third the length of the humerus. Another abscess over inner condyle of right arm. It was opened and contained foul-smelling pus. On buttocks there are multiple furuncles, closely placed and circumscribed, and show a tendency to form crusts. On left malar bone there is a rapidly developed necrotic area about the size of a half-dollar, and similar areas behind each ear.

Twelfth day. Feet cyanosed; delirious; between A.M. and P.M. skin on neck and over lower jaw softened over an area of one and one-half by two inches. It almost seems to melt while examining the patient.

Thirteenth day. Necrotic areas deeper. Patient emaciated to the last degree. Died.

Autopsy by Dr. Muehleck forty-five hours after death. Pronounced rigor. About five feet eleven inches. Necrotic areas are noted. Section: Tissues extraordinarily dry; knife creaks in cutting. Thoracic organs normal. Peritoneum markedly injected, recent adhesions. Liver extends one inch below floating ribs. Right lobe to median line; left lobe and lobus spigela markedly enlarged, extending around anterior surface of the spleen. Colon exceedingly distended, through peritoneal surface of which well-marked ulcers can be seen. Right kidney enlarged one-third, lobulated, distinct evidences of infarction. Left kidney almost double the normal size; capsule not adherent; marked infarction. Spleen enlarged, friable, lobulated, and infarcted. Post-peritoneal glands extensively indurated. Extreme dryness of each tissue and organ.

FIG. 1.



Case II. (post-mortem). Showing necrotic area on right ear and forehead.

CASE II. (Hospital No. 1321, and No. 41 in this series).—F. M., aged twenty years. Admitted September 11, 1898. Ill for about a week. No spots; spleen enlarged; abdomen tympanitic.

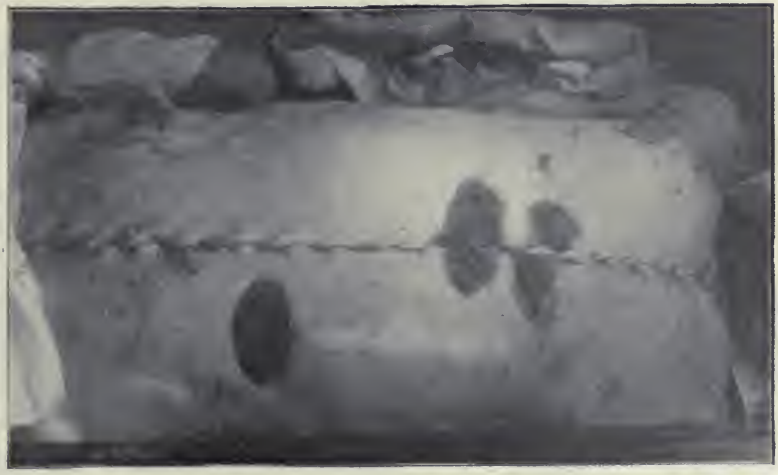
13*th*. Active delirium. Second heart sound accentuated. Bronchitis with moist râles.

15*th*. Superficial cyanosis over trunk. First sound of heart weaker in force, second sound accentuated. Dermatitis about spine of scapula.

16*th*. The tissues show a decided tendency to break down. The skin above right ear and on left forearm has broken down. Although the temperature is approaching normal, the patient remains stuporous. Patient very ill; stuporous; respirations labored. Dermatitis on scapula is scaling. There is an area two by one inch of melted skin on forehead. Yesterday there appeared on either side of the sternum two patches of dermatitis, which rapidly attained the size of a silver dollar, and to-day are confluent. Result: Death. (See Figs 1 and 2.)

Autopsy by Dr. Muehleck. Body of a male, about five feet seven inches tall, fairly well nourished. Rigor mortis marked. Necrotic areas on neck and trunk varying in size from that of a pea to the size of the hand. These are located notably over the ulnar surface of the forearm, anterior aspect of the chest, epigastrium, ilium, trochanters, also over forehead, zygomatic process, right ear, on back and sacrum, and on scrotum. Tissue moist on section. Heart normal. Liver enlarged, notably the right lobe; surface smooth. Parenchyma moist, and shows a degree of fatty degeneration. Spleen two and one-half times normal size, markedly lobulated Substance friable. Peritoneum very much injected. No adhesions. Stomach distended. The mucous membrane is the seat of numerous ecchymotic spots or areas of dark-red color. The organ contains considerable blood, altered by digestion. Right kidney twice the normal size, and shows traces of lobulation; capsule adherent, but strips easily. Cortical substance well defined. Lower pole of kidney is the seat of a hemorrhagic infarct, at the site of which the tissues are necrotic, forming a cavity the size of a hazelnut. The suprarenal body shows nothing abnormal. The same note is true of the left kidney. The parenchyma of both kidneys show cloudy swelling. Lungs: Left upper lobe is the seat of a hemorrhagic infarct, and the right upper lobe shows the same condition. Intestines: The ileum for a distance of from three to four feet from the ileocæcal valve shows very numerous typhoidal ulcers, over which the peritoneum is in a state of extensive necrosis. Vermiform appendix is deeply injected.

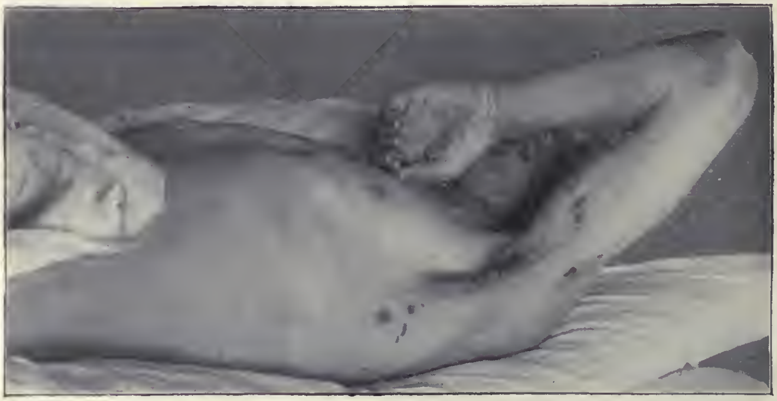
FIG. 2.



Case II. (post-mortem). Showing four necrotic areas that rapidly became confluent, forming two, also a single deeper area lower on abdomen.

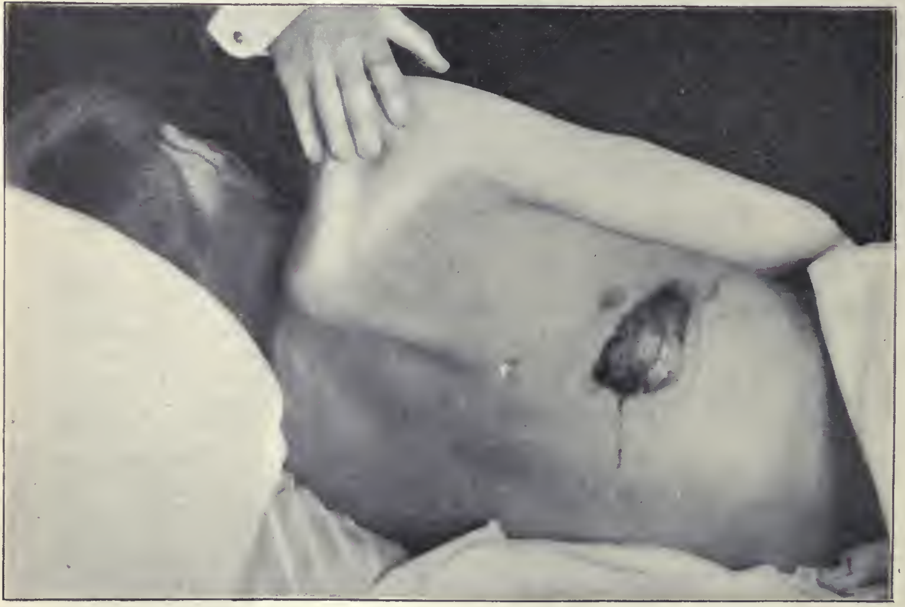
Case III. (Hospital No. 1506, and No. 59 in this series).—C. T. R., aged twenty-one years. Admitted September 23, 1898. Ill three weeks, and in bed ten days. Spots present; diarrhœa; gums inflamed; fecal incontinence.

Fig. 3.



Case III. Showing small areas on left arm and left side of the trunk, which were markedly vesicular, and from which cultures were made.

Fig. 4.

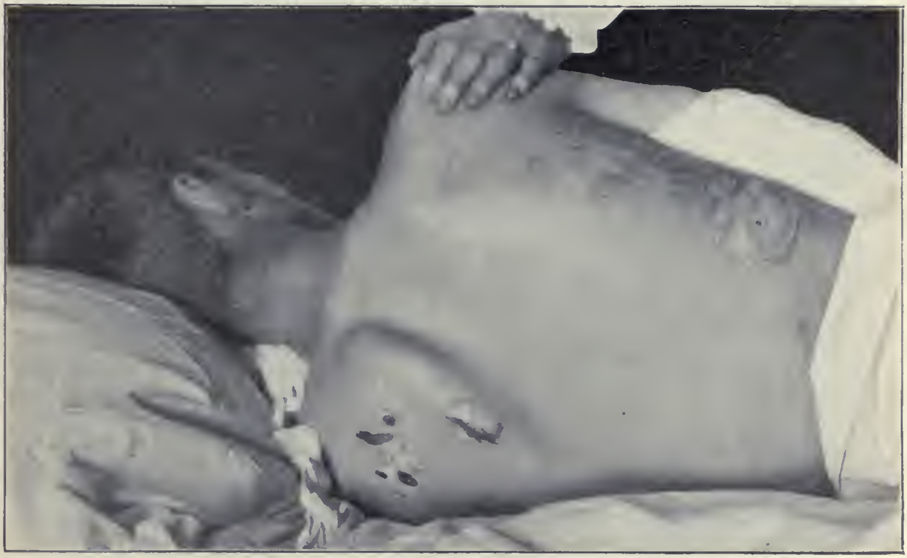


Case III. (picture taken same day as was that of Fig. 3). Showing deep necrotic areas under right scapula, with beefy appearance and exuding blood.

October 5th. Over sacrum there is a purpuric area one by two inches. On left arm there is a similar patch the size of a half-dollar, and on left side of trunk there are six patches, varying in size from a dime to a nickel. These appeared as vesicles, and show a tendency to dry up. In the left axilla there is a small vesicle on a base the size of a quarter. On the left arm there are two vesicles, containing a serous fluid, each the size of a dime. Below the right scapula there is a patch the shape of an oyster-shell, having a diameter of two and one-half by three and one-half inches. Around the circumference of this area there is a loss of the superficial integument, and at the centre there is a breaking-down into the deeper layers of the skin. The remainder of the patch is deeply pigmented. (See Figs. 3 and 4.)

6th. The entire surface of the oyster-shell shaped patch is now raw and bleeding. The integument at the centre, which was intact yesterday, is broken down to-day. Above the sore there is a patch one by three-quarter inch, oval in shape, with the superficial skin lost and the underlying layers deeply injected.

Fig. 5.



Case III. (picture taken six days later than those shown in Figs. 3 and 4). Shows the rapidity with which healing occurred and the development of new areas, vesicular in type, over the left scapula.

8th. Oyster-shell shaped area looks healthier, less beefy, and there is over its surface a layer of odorous pus.

11th. Gangrenous over and under right scapula healing. Five areas, of varying sizes, have appeared over the left scapula. (See Fig. 5.)

12th. Patient improved, patches healing.

17th. Has icterus. Patches nearly healed. Entire recovery.

Case IV. (Hospital No. 1530, and No. 72 in this series).—W. H. B., aged twenty-seven years. Admitted September 23, 1898. Ill ten days before admission. On admission had spots, diarrhœa, tender over spleen, persistent cold extremities, distressing cough with blood-streaked sputum, bronchial breathing and dulness at the base of the right lung.

October 3d. Blurring of the first sound of the heart at the mitral area.

7th. Has parotitis.

8th. Over the right scapula there is an area of erythema three by four inches, with glazed skin and breaking-down of the superficial layers of the skin, and showing the papilla very prominently.

9th. On the posterior surface of the right thigh there is an oval-shaped patch as large as a half-dollar, with a dry, scaly condition of the epidermis.

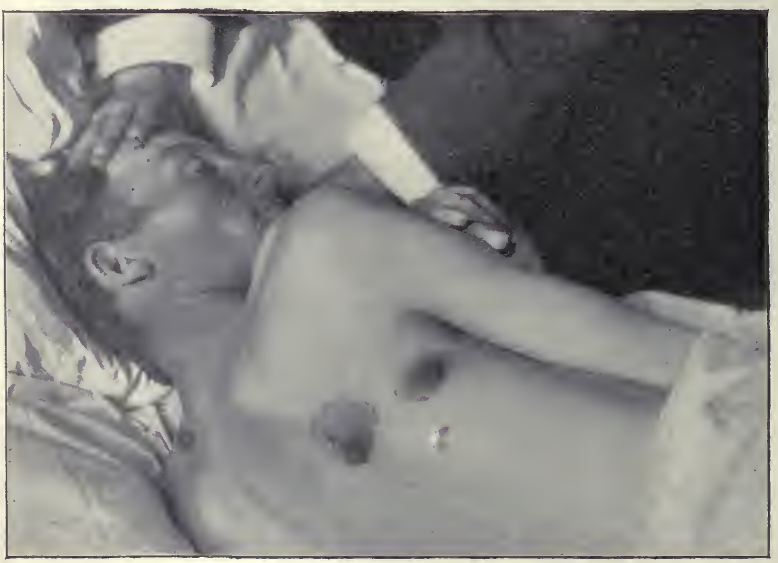
12th. Both patches healing rapidly.

13th. Complains of toes being very painful.

18th. Sores and toes well. There has developed a swelling to the left of the median line, midway between the umbilicus and the pubis, and extends to the pubis. It is two and one-half inches wide, and is tender on pressure. It is not superficial, and yet it is not deep enough to be within the abdominal cavity.

25th. Swelling is cone-shaped, more superficial, and the skin is red. It feels like a patella in the abdominal wall. This condition disappeared without operation. Result: Recovery.

FIG. 6.



Case V. Showing the vesicular form of the disease. All the areas involved not shown. See text.

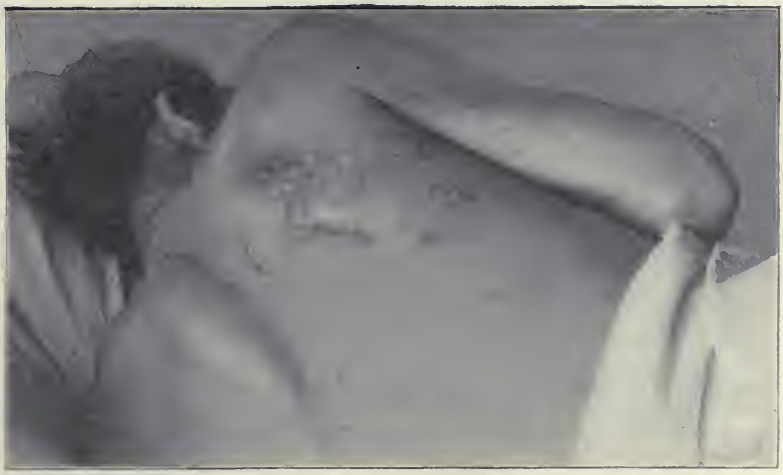
CASE V. (Hospital No. 1534, and No. 76 in this series).—G. S., aged twenty-three years. Admitted September 23, 1898. Ill nine days; spots; splenic enlargement; receding, unhealthy gums.

30*th*. First sound of the heart weaker at the mitral area, and the second accentuated.

October 5*th*. Bed-sore over sacrum. On right ala of nose there is a necrotic area one-half by one-quarter inch. Near sacrum there is an ulcerated point and an oval vesicle containing clear serum, having an area of three-quarter by one-and-a-half inches. There is a circular vesicle over left scapula, having a diameter of one inch. On right side of the posterior axillary line, at the angle of the scapula, there is a vesicle one and one-half by one and three-quarter inch, containing clear serum. Two inches posterior to this there is a hyperæmic area with a small vesicle at one part of it. Heart sounds are better.

8*th*. Patches have not extended, and are healing rapidly. On left ilium there is an oyster-shell shaped patch three by two inches, with deepest injection at the margins, while the skin at the centre of the patch is livid. No vesicles. Above and out from this there is a vesicle with dull red base, one and one-half by one inch. To the left of this point there is another vesicle of the same character one-half by one inch. Just back of the great trochanter there is a circular patch, one inch in diameter, with a deep red base, and glazed surface, but no vesicles. (See Figs. 6 and 7.)

FIG. 7.



Case V. (picture taken six days later than that shown in Fig. 5). Shows the rapidity of healing and the involvement of new areas.

10*th*. Patches healing. One small, new vesicle, containing serum, has appeared.

12*th*. Sores have so nearly healed as to show only what appears to be a desquamating dermatitis.

17*th*. Phlebitis of left leg. Phlegmasia.

CASE VI. (Hospital No. 1541, and No. 81 in this series).—F. Q., aged twenty-four years. Admitted September 23, 1898. Ill one week; chill; nose-bleed; spots; enlarged spleen.

October 13*th.* Has slight furunculosis over right ilium, also two small areas of necrosis, with vesicles. Result: Recovery.

Case VII. (Hospital No. 1188, and No. 92 in this series).—L. S., aged nineteen years. Admitted August 29, 1898. Ill three weeks. Vertigo, spleen enlarged, cough, no spots.

September 3*d.* Did not give Widal reaction.

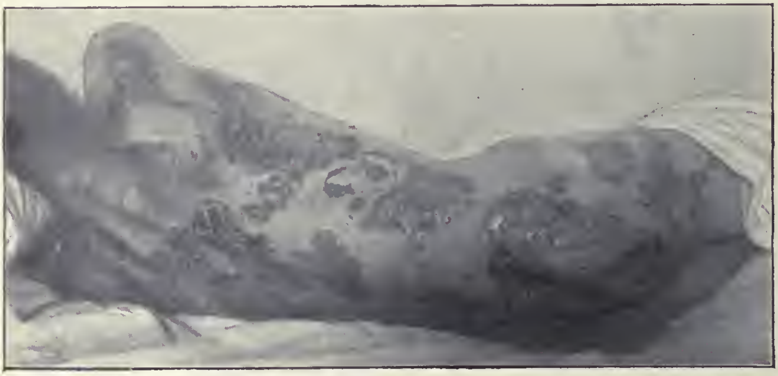
5*th.* Spots appeared. Muscular sound of the heart weak. Second sound accentuated.

12*th.* Bed-sore at sacro-lumbar articulation, also one over spine of left scapula. Furunculosis. Pneumonia of left lower lobe of lung.

15*th.* First sound of the heart exceedingly weak, second sound accentuated. Heart action irregular. Coma vigil.

21*st.* Somnolent. Says he feels well. The back is denuded of the superficial layers of the skin over about one-quarter of its surface. No patches on face, legs, or arms. Feet tender to touch and motion. Muscular sound of the heart very weak.

Fig. 8.



Case VII. Extreme emaciation and deep bed-sores, with extensive involvement of skin of the back and thighs.

23*d.* There is tissue necrosis involving three-quarters of the entire surface of the back. On the spine of both scapulæ there are two deep necrotic areas, each the size of a quarter-dollar. The disease on the back has lessened, but there still remains marked discoloration around the newly formed skin. Over the lumbo-sacral articulation there is a bed-sore five by six inches, showing clearly the uncovered muscles. Patient much improved Tenderness along femoral vein. Complains of numbness of the left foot. Radial pulse has no volume. The skin over the spine of the left scapula has broken down over an area one and one-half by two and one-half inches There are several small patches of necrotic tissue around this area. The necrotic areas on the lateral aspect of right chest have practically healed. Marked brachial pulsation throughout its entire course. There is a condition of arterial sclerosis of the brachials and radials. Complains of numbness in the fingers. There is quite a deep furuncle below and to the outer side of the left knee. (See Fig. 8.)

October 15*th.* Gave Widal reaction.

12*th.* Improved The brachial and radial arteries in the right and left arm are still more corded. Rolls under finger, and can scarcely be obliterated. The condition is most pronounced in the right arm. There is blurring of both heart sounds at the mitral area.

31*st.* Brachial arteries cannot be compressed, radials less markedly rigid.

November 7*th.* Phlegmasia of right leg. Result: Recovery.

CASE VIII. (Hospital No. 1248, and No. 93 in this series.)—H. S. (hospital steward), aged nineteen years. Admitted September 29, 1898. Ill five days. No symptoms of typhoid. Malaise and coryza.

7*th.* Temperature normal for four days; allowed to be up.

11*th.* Went driving, ate Schweitzer cheese, rye bread, and drank milk-punch. Returned to hospital at 11 P.M. The next day the temperature was 105° F., and a relapse, extending from the 12th to the 15th, began.

26*th.* Urethral discharge.[1] Tender joints and painful glands in axilla. Heart sounds good.

October 2*d.* Right leg and foot swollen and tender. Femoral vein tense. Tender along left brachial nerve, and the axillary glands are enlarged and the skin over them is red. Right brachial is free. No heart murmur.

6*th.* Had a chill. Skin over insteps and about joints on the hands is blue.

10*th.* Pneumonia of left lower lobe of lung. Great tenderness when the abdomen is slightly percussed.

12*th.* Had four hemorrhages, losing about three pints of blood.

16*th.* No muscular elements to the heart sounds. Delirious, hiccough, persistent vomiting. Has " sores " on back and legs. Had four hemorrhages. Lost two and one-quarter pints of blood.

20*th.* Pulse irregular and extremely weak. Has a large bed-sore on the back. The right foot is of a purplish color; looks almost gangrenous. There is a large bed-sore on the back of the right leg.

22*d.* Right foot and leg half way to the knee of a purplish black color.

25*th.* Discoloration has disappeared, and sensation has returned as far as the ankle. There is maceration of the skin of the foot, and the skin over the great toe and heel is black.

26*th.* Patch of gangrene back of bend of right knee, one by three-quarter inch. Also one on outer aspect of the calf of the leg, oval in shape, two by one and one-half inches. Skin over these areas dark and purplish, with a greenish-gray centre.

November 11*th.* No heart murmurs. Leg amputated at the middle by Dr. Ransley. Patient now under the care of Dr. J. P. C. Griffith.

Dr. Rhein reports the persistence of the brachial neuritis, and diminished or absence of power in the biceps, triceps, and deltoid muscles. Result: Recovery.

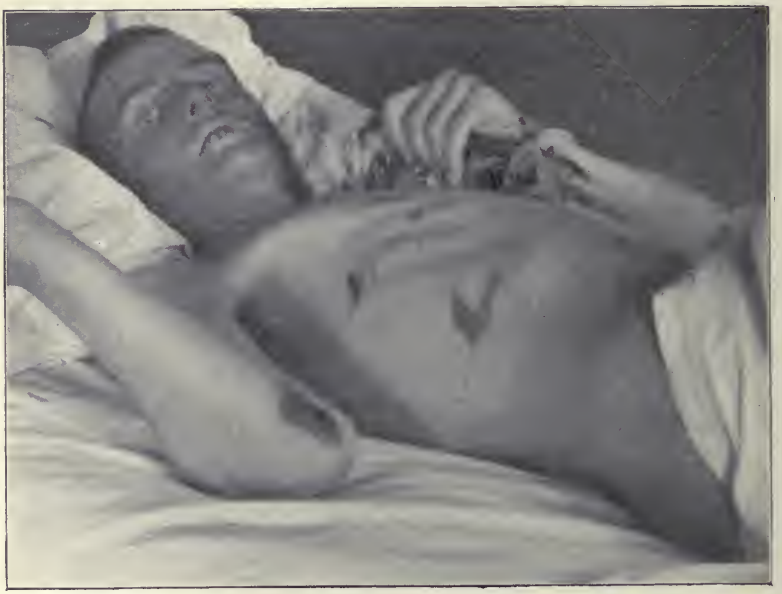
CASE IX. (Hospital No. 1432, and No. 121 of this series).—N. R., aged twenty-one years. Admitted September 15, 1898. Ill one week. Malaise, chilly, and coated tongue. No spots.

---

[1] The patient persistently denied exposure to gonorrhœal infection, and since there could be no object in his denying the truth, and his critical condition gave what he said the character of an ante-mortem statement, it seems to me that this must be regarded as a case of urethritis of typhoidal origin.

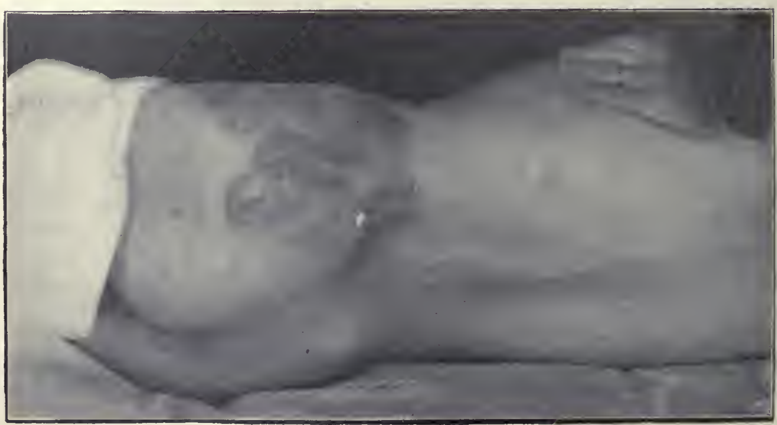
22*d*. Spots, tympany, and a loud systolic mitral murmur, which is transmitted to the axilla.

FIG. 9.



Case IX. Shows areas of gangrene that were preceded by ecchymosis rather than vesicles. The black spots that are seen in the region of the left hand and forearm are the stems of some roses he held in his hand.

FIG. 10.



Case IX. (taken same day as picture shown in Fig. 9). The skin over the areas involved showed a purpuric discoloration and "goose-flesh" appearance rather than an ecchymosis or vesiculation before the gangrene developed.

28th. Decided redness of the nose and face. Delirious. Unable to keep him in the bath the usual length of time, because of cyanosis. Bath, eight minutes.

October 3d. Ecchymotic areas have appeared on the right side of the trunk, between the nipple and the lower edge of the ribs. The skin over this area is broken. On the left side of the chest to the side of the sternum, extending to the anterior axillary line, at the eighth interspace, there is an ecchymotic area, also another on left side between ribs and trochanter. Posteriorly there is an area very deeply tinted, extending from the left iliac crest to the lumbo-sacral articulation, and to the trochanter—an area six by seven inches. No break in the skin or sign of bed-sore. (See Figs. 9 and 10.)

4th. Patch on right elbow two by two inches. Skin broken over an area equal to one cent. Other patches have not extended. Patch over liver has an area of broken-down integument the size of a cent. All these areas are very painful. The only furunculosis is one on the nose and three on the left index finger. Complains of great pain in the ball of the great toe. Color of patches is deeper.

5th. Over purpuric area on hip the skin is markedly goose-fleshed. Some furunculosis about the buttocks.

10th. Skin over areas noted is very dry and shrivelled. Result: Recovery.

Case X. (Hospital No. 1240, and No. 33 in this series).—W. M., aged twenty-five years Admitted August 29, 1898. Ill three weeks. Splenic enlargement, iliac gurgling, and tenderness.

September 3d. Patient actively delirious, and has to be tied in bed. There are spots on the right shoulder that are of a purple color. Heart sounds good.

8th. Exceedingly restless, constantly turning in bed. Mitral regurgitation. Result: Died September 13, 1898.

I desire to acknowledge my indebtedness to Dr. J. F. Schamberg and Dr. L. Job Lane (then a medical student in the University of Pennsylvania) for the photographs I am able to show you, and to Dr. E. D. Mitchell, Dr. W. B. Fetterman, and Dr. J. P. Wales, resident physicians at St. Agnes' Hospital, for valued assistance in the collection of the data contained in this paper.

CONCLUSIONS BASED ON SIXTY CASES OF FATAL GASTRO-INTESTINAL HEMORRHAGE DUE TO CIRRHOSIS OF THE LIVER.

By R. B. Preble, A.B., M.D.,
CHICAGO, ILL.

The following brief clinical and post-mortem notes of four new cases of fatal gastro-intestinal hemorrhage—three from my hospital experience and one kindly furnished me by Dr. R. B. Olson—will serve as an introduction. To these four cases fifty-six collected from the literature have been added, together forming the basis for conclusions drawn in regard to the pathogenesis of these hemorrhages and the effect which œsophageal varices, their most common cause, exert upon the clinical course of cirrhosis of the liver.

CASE I. Seen with Dr. B. W. Sippy.—A. B., laborer, aged fifty-two years; moderate drinker; syphilitic. Sick eight weeks with pain in the right side. Two weeks later swelling of the abdomen, and five weeks later œdema of the legs. Anorexia, constipation. Examination: fairly nourished; slight jaundice; ascites; lungs and heart negative; spleen enlarged; urine negative. Eleven days after the entrance to the hospital slight hemorrhage from the bowels. Next day severe hemorrhage. Died next day. *Autopsy.* Typical atrophic cirrhosis, splenic tumor, ascites, large varices in the lower end of the œsophagus. No rupture (not tested by injection). Blood in œsophagus, stomach, and intestines. Mucous membrane of stomach and intestine congested, but show no ulceration or erosion. Phrenic and subperitoneal veins enlarged.

CASE II. Seen with Dr. Walls.—J. B., aged sixty-two years; alcoholic; syphilis denied. Has had several attacks of jaundice. Sick five weeks with anorexia; constipation; gastric disturbance; swelling of abdomen and legs. Examination: œdema of legs; ascites; lungs and heart negative; liver dulness decreased; spleen enlarged. Urine contains granular and fatty casts and albumin. Twelve days after entrance hæmatemesis and melæna, repeated until death, two days later. *Autopsy.* Atrophic cirrhosis of the liver. Varices in the lower part of the œsophagus, one of which is ruptured. Parenchymatous nephritis. Heart and lungs normal.

CASE III. Dr. Preble.—L. R., aged fifty years; alcoholic. Family and personal history negative until six months ago, when he had dysentery. Four months ago swelling of the legs and abdomen, increasing until six weeks later. He was tapped at one of the city hospitals. Fluid began at once to re-collect. Examination: fairly nourished; slight jaundice; ascites; œdema. Lungs negative. Heart negative except for hæmic murmur at the base. Liver enlarged, hard, firm, and granular. Spleen enlarged. Enlarged superficial veins on the abdomen. Three weeks later hæmatemesis and melæna, frequently repeated, until death on the second day. *Autopsy.* Ascites; lungs and heart normal; atheroma of aorta; liver small, hard, almost cartilaginous; spleen enlarged; varices in the lower part of the œsophagus with an ulcer just above the cardiac orifice. Stomach and intestines negative; contain a large amount of blood.

CASE IV. Dr. Olson.—Male, aged fifty-three years; alcoholic; ascites and œdema. Complains of swelling of the abdomen and legs; weak; stomach irritable; constipated. Examination: emaciated; no jaundice; ascites; œdema; enlarged spleen; subcutaneous abdominal varices. Heart, lungs, and kidneys negative. *Autopsy.* Atrophic cirrhosis of the liver; spleen enlarged; varices in lower part of the œsophagus, one showing a rupture. Stomach and intestines show intact mucous membrane. Heart, lungs, and kidneys negative.

The occurrence of fatal gastro-intestinal hemorrhage due to cirrhosis of the liver has been known for many years, but the cases have never been collected, and the subject, though of some importance, is merely mentioned in most text-books and in but one—that of Labadie-Lagrave, *Maladies der Foie*—is it treated with anything approaching care. Since Fauvel, in 1858, reported the first case of ruptured œsophageal varices in cirrhosis of the liver this subject has been treated in several Paris theses and articles in English and German periodicals, but the conclusions reached have been based on too few cases, and most authors have tried to find a single pathogenesis. We have here collected all the cases of fatal gastro-intestinal hemorrhage due to cirrhosis of the liver found in literature, including only those cases in which the hemorrhage, either as a hæmatemesis or a melæna, was the immediate cause of death, and the diagnosis was confirmed by post-mortem examination.

It is a well-known fact that hemorrhages from various places are frequent in the course of cirrhosis of the liver, either as the result of mechanical obstruction to the portal circulation—the popular example of which is hemorrhage from hemorrhoids, although hemorrhoids are no more common in patients with cirrhosis than in other people, or as the expression of acquired hemorrhagic diathesis, epistaxis, for example. The gastro-intestinal hemorrhages which occur may be of either class, but the majority are due to the obstruction to the return circulation through the liver, and are naturally more frequent in the atrophic than in the biliary form of cirrhosis, though they occur with both, and even fatal gastro-intestinal hemorrhages occur with other diseases of the liver not usually associated with portal obstruction, as is illustrated by a case of acute yellow atrophy reported by Hanfield Jones.[48]

As already stated, several authors have attempted to give a single explanation for these hemorrhages. Dusaussay[30] believed them due to ruptured œsophageal varices which were the result of the portal obstruction, but was unable to explain the rarity of these varices. This explanation is manifestly incomplete, for cases are reported in which the most careful examination showed no varices. Chautemps[49] also referred them to œsophageal varices, but regards the varices as due to a varicose diathesis resulting from the cirrhosis. This view is at least far-fetched. The humeral theory, or hemorrhagic diathesis, although it explains the hemorrhages from the nose, mouth, and into the skin as well as we can at present explain them, is, in my opinion, applicable only to those cases in which no varices were found. It certainly does not apply to those cases in which a rupture of a varix could be demonstrated.

Because of the incompleteness of the post-mortem reports the source of the hemorrhage cannot be determined or inferred in eighteen of the sixty cases, because the œsophagus is not mentioned. In seven of these eighteen cases there is no note as to the condition of the gastro-intestinal mucous membrane. In nine the membrane showed neither ulceration nor erosion. One showed a hemorrhagic erosion near the pylorus

(Case XLIX.), and in one (Case XXIV.) the hemorrhage was from the "loosened and softened gastric mucous membrane."

Of the forty-two cases in which the œsophagus was examined varices were present in thirty-five—*i. e.*, 85 per cent. In one case (XXV.) it is not stated whether they were present or not, but one would infer that they were not, and in six they were absent. The source of the hemorrhage was given in nineteen cases—sixteen times from rupture or ulcerated œsophageal varices; twice (Cases XI. and XXVII.) from ulcers over gastric veins near the cardiac, and once from an erosion near the cardia. In fifteen other cases showing varices it is stated that the gastro-intestinal mucous membrane was intact. The source of the hemorrhage in these cases cannot be certainly stated, but it is probable that in many of them small ruptures of the varices were overlooked, as may easily happen unless the veins are tested by injection with air or fluid. There are six cases in which there were no varices, and the gastro-intestinal mucous membrane was intact throughout. The explanation of the hemorrhage in these cases is not so clear, but they may be due to minute changes in the capillary walls or to alteration in the composition of the blood.

The veins of the cardiac end of the stomach are part of the portal system, while those of the œsophagus are part of the systemic system. Here, as at the lower end of the intestinal tract, the two systems are connected by anastomosing branches which, as a rule, according to Orth and Kundrat, are too small or too few to contribute much to the formation of a collateral circulation when the portal system is obstructed. But when this anastomosis is free they become an important factor, and their dilatation may so completely compensate for the veins obstructed in the liver that the clinical course of the cirrhosis is altered and obscured.

The œsophageal veins are abundant and arranged in two groups—the submucous and the periœsophageal—both forming networks of long meshes, the length of the mesh falling with the long axis of the œsophagus. There are from two to four main longitudinal branches connecting freely with each other. Branches penetrating the muscular coat of the œsophagus connect the two groups. This network extends from the cricoid cartilage to the cardiac orifice, and in most cases the network becomes closer as the cardia is approached. The blood from the œsophageal veins returns to the heart through the inferior thyroid, intercostal, diaphragmatic, azygos minor, internal mammary, and bronchial veins, all of which may be dilated to a varying degree in cases of free anastomosis between the œsophageal and cardiac veins. The fact that this anastomosis is only exceptionally free explains why œsophageal varices are so rarely found on post-mortem examination of patients dying with cirrhosis of the liver. Furthermore, the œsophagus is not always examined, and even when it is the dilated veins may escape observation unless especially sought for.

The arrangement of the varices is not always the same. In most cases they are limited to the lower two-thirds of the œsophagus, and usually end abruptly at or near the cardiac sphincter, but in a few cases they continue over the sphincter into the stomach, where they may rupture, the walls of the veins being eroded by the acid contents of the stomach. Rarely the varices are limited to the upper part of the œsophagus.

There are a number of factors which favor the formation of these varices. They are so close to the seat of obstruction and their course is so direct that they feel the increased pressure sooner and to a greater degree than the more remote and indirect paths for the collateral circulation. They are but slightly supported by the submucous tissue of the œsophagus, and this support becomes progressively less as the dilating veins lead to pressure atrophy of the tissue about them. Rossapelly and Burt call attention to another and important factor which favors their formation. The œsophageal veins, being intrathoracic, feel the negative pressure of inspiration, while at the same time the pressure in the portal system rises to fourteen or even eighteen millimetres of mercury. In this way the blood is literally aspirated from the coronary into the œsophageal veins, and leads to their permanent dilatation.

The immediate cause of the hemorrhage is not always the same. Any sudden increase in the obstruction to the return flow of the blood will cause rupture of a varix. In several cases the hemorrhage was preceded by sudden extreme muscular exertion, in others by thrombosis of one or more of the main portal veins. In others the hemorrhage followed shortly after paracentesis. Many cases remain in which the hemorrhage seems to have been spontaneous. Possibly some of the cases were due to mechanical injury to a varix by some rough bit of food.

Debove and Courtois-Suffit[56] refer the hemorrhages to a congestion of the portal system, and hold that in those cases where there is no demonstrable lesion of the mucous membrane the hemorrhage is due to the simultaneous rupture of many capillaries. When the blood-pressure, for any reason, tends to rise the normal pressure is maintained to a large degree by the collection of an increased amount of blood in the portal system. In health this does not cause hemorrhage, for the liver by enlarging can accommodate a large amount of blood, and the passage from the portal to the systemic circulation is free and unobstructed. But when the liver becomes cirrhotic it loses its elasticity and can no longer contain any considerably increased amount of blood, and it so obstructs the portal circulation that hemorrhage may result when the amount of blood going to the portal system is increased.

The influence of varices in the œsophagus upon the clinical course of cirrhosis varies with the completeness with which they compensate for the obstruction to the portal veins. The compensation may be so complete that all of the clinical symptoms upon which a diagnosis of cirrhosis of the liver must depend, namely, the splenic tumor, the ascites and the subcutaneous abdominal varices, are wanting, and the patient, while apparently in good health, dies suddenly from hemorrhage from the stomach. Of the thirty-five cases in which varices were found, hemorrhage was the first and only symptom in ten, and in five of these hemorrhage had occurred at intervals over periods varying from a few months to five years, while in the other five cases death resulted from the first hemorrhage. Case XXIV., reported by Schilling, is the best known of this class, and is generally regarded as the first case on record; but six others preceded it, the first being Case XXI., reported by Marsh, over twenty years before Schilling's report. In seven other cases hemorrhage was the first symptom, but after a longer or shorter interval other symptoms appeared, so that the correct clinical diagnosis could be made. However, it is to be noted that in only one of these cases did all three of the cardinal symptoms develop. In four other cases the patient came under medical attention for hæmatemesis, and other signs of cirrhosis were found at the first examination.

In fourteen cases the hemorrhage was preceded by other symptoms; thirteen times by ascites, six times by splenic tumor, and six times by subcutaneous abdominal varices.

Thus, when varices are present and cause hemorrhage, one-third of the cases die from hemorrhages without any accompanying sign of cirrhosis. In one-third hemorrhage is the first symptom, and others follow, and in the other third the hemorrhage is preceded by other symptoms.

Of the seven cases in which no varices were found in the œsophagus, five showed two or more of the cardinal symptoms, and in two the hemorrhage was the only symptom, and the cases were both diagnosed "ulcer of the stomach." This class of cases is in marked contrast to the preceding, for in over 70 per cent. of the cases the correct diagnosis can be made at the first examination, while in the first class of cases in nearly 70 per cent. of the cases the diagnosis cannot be made clinically at all or only after the lapse of months or, in some cases, years.

Of the eighteen cases in which the œsophagus was not examined, in five hemorrhage was the first and only symptom. In three hemorrhage was the first and other symptoms followed. Two came under medical care for hæmatemesis, and other signs of cirrhosis were found. In seven the hemorrhage was preceded by other symptoms.

There is but little to say of the diagnosis of these hemorrhages. If two or even one of the symptoms of cirrhosis of the liver is present the possibility of the hemorrhage being due to cirrhosis at once suggests itself, but in other cases there is nothing to warrant such a suspicion, and other and more common causes for hæmatemesis are frequently assumed. This is illustrated by such cases as XXXVI. A young woman, apparently in her usual health, suddenly vomits a large amount of blood. The physical examination is negative. The natural diagnosis in such a case is ulcus ventriculi, but at autopsy the case was found to be a well-marked cirrhosis of the liver, and there was no sign of ulcer of the stomach.

The opposite error is not so easily made, but that it could be is well illustrated by two cases recently seen with Dr. Walker and Dr. Ochsner at the Cook County Hospital. Both cases were men between forty and fifty years, hard drinkers for many years. Both vomited a large amount of blood while at their usual work and in their usual health. Neither had any gastric disturbances other than could be referred to the chronic alcoholism. In both the physical examination was negative. There was no change in the hepatic dulness, no splenic tumor, no ascites, no superficial varices, no localized or diffused epigastric tenderness. The hæmatemesis continued over a few days to death. Were they cases of gastric ulcer or obscured cirrhosis of the liver? The general condition of the patients was so good as almost to exclude any thought of carcinoma. The age, sex, and lack of gastric symptoms spoke against ulcer. The negative physical examination spoke against cirrhosis. Fatal hemorrhage from either cause is rare. The post-mortem examination showed that both were cases of gastric ulcer, and the eroded vessel could be seen on the base of the ulcer. There was no suggestion of any change in the liver.

There are several other possible questions of diagnosis, such as carcinoma of the stomach; the rupture of a thoracic aneurism into the œsophagus; the opening of a traction diverticulum of the œsophagus into the aorta or pulmonary artery; rupture of an abdominal aneurism into the stomach. All of these, except the carcinoma of the stomach, are rather remote possibilities, and would lead to death from hemorrhage so rapidly that there would be no opportunity for a differential diagnosis. Carcinoma of the stomach can be considered only when there are no signs of cirrhosis. Moreover, a cancer of the stomach, which causes serious gastric hemorrhage, has usually caused a palpable tumor and some cachexia.

The treatment of these hemorrhages differs in no way from that of gastric hemorrhages from other causes. Some of the French authors suggest pressure on the ruptured varix by a soft rubber bag passed to the lower end of the œsophagus and then filled with air or water. So far this method has never been tried, and the difficulties of accurate diagnosis and the condition of the patient is such that the suggestion does not seem an especially good one.

CONCLUSIONS. 1. Fatal gastro-intestinal hemorrhage is an infrequent but not rare complication of cirrhosis of the liver.

2. In the great majority of the cases the cirrhosis is atrophic, but it may be hypertrophic.

3. In one-third of the cases the first hemorrhage is fatal; in the other two-thirds the hemorrhages continue at intervals over a period varying from a few months to several years, the maximum given being eleven years.

4. In one-third of the cases the diagnosis can be made at or before the time of the first hemorrhage. In the other cases the diagnosis cannot be made at all or only after months or years, during which time other symptoms of cirrhosis have developed.

5. Œsophageal varices are present in 80 per cent. of the cases, and in more than one-half of this 80 per cent. the varices show macroscopical ruptures, and it is probable that many other ruptures would be found if the varices were tested by injection of air or fluid.

6. Fatal hemorrhages occur in cases which show no œsophageal varices, and they are probably due to the simultaneous rupture of many capillaries of the gastro-intestinal mucous membrane.

7. The hemorrhages in this class of cases are usually preceded by other symptoms of cirrhosis, but the first symptom may be a fatal hemorrhage.

8. In 6 per cent. only of the cases which showed œsophageal varices was the cirrhosis typical—*i. e.*, showed ascites, enlarged spleen, and subcutaneous abdominal varices.

CASE V. Standtharner.[9]—J. K., aged sixteen years; empyema at seven years. Pain in abdomen; liver not enlarged; spleen slightly enlarged; subcutaneous abdominal varices; no ascites. Six months later ascites. Paracentesis. Five days later vomited blood in a stream. Death. *Autopsy.* Atrophic sclerotic liver; splenic tumor. Stomach and intestines contain large quantity of blood. Œsophageal varices. Lower portion of œsophagus shows many small bleeding points.

CASE VI. Dobie.[10]—Patient in Madras Lunatic Asylum for melancholia. History of alcoholism and delirium tremens. No physical symptoms of ill health except emaciation. Went to bed in usual health. Next morning half-conscious, dilated pupils, weak pulse, tarry stools in bed. Repeated tarry stools. Blood from nose and mouth and bowels. Death. *Autopsy.* Stomach and intestines filled with blood. Liver adherent, contracted, and connective tissue increased. Spleen enlarged. "Other organs showed nothing important."

CASE VII. Vincent.[11]—A. B., aged thirty-five years. Sick two days; not syphilitic; moderate alcoholic. Complains of headache, vertigo, vomiting. Temperature 100°. Chest negative. Abdomen swollen, tympanitic, tender; veins on right side slightly enlarged. Liver dulness decreased. Spleen enlarged and tender. Urine scanty and contains bile and albumin. Five days later repeated hemorrhage from mouth and bowels. Death. *Autopsy.* Heart, lungs, and pleura negative. No ascites. Liver small, hard, with smooth surface. Spleen enlarged. No further notes given.

CASE VIII. Saundby.[6]—J. R., aged thirty-six years. Entered for hæmatemesis. Alcoholic and syphilitic. Ten weeks previous vomited a pint of blood. No ascites, nor history of any. Bloody stools. Liver dulness decreased. Discharged after twenty days, to return in a week with recurrence of the hemorrhage. Died six days later. *Autopsy.* Liver contracted. A large amount of the portal blood escaped through the subscapular vein which entered through the lateral ligament. Stomach filled with blood. Œsophageal varices ending abruptly at the cardia. One vein was thrombosed, but no ulceration or erosion was found over it.

CASE IX. Wilson and Ratcliffe.[1]—F. M., aged thirty-five years. Hard chancre eighteen months ago. Ascites. Acute gastric catarrh. Slight jaundice. Spongy, bleeding gums. Liver enlarged. Death ten weeks later from hemorrhage. *Autopsy.* Ascites. Superficial abdominal veins enlarged. Hobnail liver. Veins in suspensory ligament enlarged. Three or four pints of blood in the stomach. Diaphragmatic veins enlarged. Anastomosing network about the cardiac end of the stomach. Great coronary vein enlarged. Injected fluid passed to veins at cardiac end of the stomach and to the dilated œsophageal veins, one of which was ruptured.

CASE X. Wilson and Ratcliffe.[1]—R. P., aged forty-six years; alcoholic; ascites; cerebral symptoms. Sick six months. First symptom hæmatemesis, vomiting one and a half pints of blood. No return of hæmatemesis. For the past three months slight jaundice; œdema of legs. Varices on abdomen. Spleen enlarged. No hæmatemesis, but blood in stools, and ran from the mouth after death. *Autopsy.* Liver cirrhotic. Clotted blood in the stomach. Small, punched-out ulcer on the lower part of the posterior wall of the œsophagus. Veins varicose. Coronary, diaphragmatic, intercostal, and azygos veins enlarged.

CASE XI. Wilson and Ratcliffe.[1]—T. M., aged sixty-three years. Epithelioma of forehead. Operated. Later sudden profuse hæmatemesis, repeated during several days to death. Previous history shows that three years ago, while apparently in perfect health, he had vomited a half-pint of blood. *Autopsy.* No œdema or ascites. Liver cirrhotic and granular. Thrombosis of the portal vein from the splenic into the smaller intrahepatic branches. Thrombosis recent and not complete. Sappey's vein, coronary, diaphragmatic, and azygos veins are dilated. Altered blood in the stomach. On the posterior wall of the stomach below the cardiac sphincter are two punched-out ulcers extending through the mucous membrane into enlarged veins. Injections into the œsophageal or coronary veins escape through the ulcers. Submucous veins for eight inches up the œsophagus are enlarged.

CASE XII. Hektoen.[4]— — —. Previous health good except for hæmatemesis one year ago. Evening before entrance, without apparent cause, vomited a large amount of blood. Repeated. No history of gastric disturbance or epigastric pain. *Autopsy.* No ascites. Spleen enlarged. Liver small, firm, and granular. Stomach contained some dark fluid blood Gastric mucous membrane intact. Small intestines contain a large amount of dark-clotted blood. Varicose veins in the lower four to five centimetres of the œsophagus. Short distance above the cardia a small loss of mucous membrane and rupture of a vein.

Case XIII. Hadden.[14]—Male, aged thirty-three years. Jaundice five years ago. Strong suspicion of syphilis. Ten days ago profuse hæmatemesis. Blood in stools for several days. On admission anæmic, slightly jaundiced. Liver and spleen enlarged. Hæmatemesis. *Autopsy.* Cirrhosis of the liver. No ascites. Much blood in the stomach, which shows no sign of congestion or ulceration. Varices in lower 5-6 inches of the œsophagus. No sign of rupture of these vessels.

Case XIV. Taylor.[15]—Child, five years old, measles and scarlet fever. Jaundice four months ago. Liver and spleen enlarged. No ascites. Later ascites and œdema. Later prominent veins, jaundice, and epistaxis. Paracentesis. Few days later hæmatemesis and death in collapse. *Autopsy.* Ascites; œdema of lungs. Stomach contains much blood. No erosion or ulceration. Gastric veins here and there distended. Intestines full of blood. Spleen enlarged. Liver small and granular. Microscopically, interstitial hepatitis.

Case XV. Nixon.[16]— — —. Aged twenty-two years. Strictly temperate. Two years ago, while in usual health, sudden pain in abdomen, profuse hæmatemesis, continuing several days. Jaundice, ascites, and œdema. One year ago pain in umbilical region and a tumor the size of an orange appeared. Examination showed anæmia, no ascites, spleen enlarged, enormous caput, medusæ, and decrease in size of liver dulness. Profuse hæmatemesis and death. *Autopsy.* Splenic tumor; no ascites. Liver cirrhotic. Perihepatitis. Stomach distended. No further post-mortem notes.

Case XVI. Foot.[17]—Man, aged forty years, alcoholic. Complains of ascites and œdema of short duration. No jaundice. Shortly after admission vomited dark, grayish-black fluid. This repeated at intervals for thirty-six hours until death. *Autopsy.* Ascites. Typical atrophic cirrhosis of the liver. Spleen not enlarged. No abrasion of the gastric mucous membrane. No note on œsophagus.

Case XVII. Minot.[18]—Man, aged fifty-eight years, alcoholic. Sudden hæmatemesis, repeated at intervals for several days until death. *Autopsy.* No ascites. Liver large, rough, and hobnailed. Stomach contained a large amount of blood. No ulceration. Near cardiac end of stomach a deeply congested area. No large vessels.

Case XVIII. Seymour.[19]—Man, aged forty-two years, alcoholic. Coffee-ground vomit. No ascites. Liver enlarged. Later jaundice, emaciation, some ascites, liver dulness decreased. Hæmatemesis. Died next day. *Autopsy.* Abdomen only. No ulceration or infiltration of the stomach, which, with the intestines, is filled with blood. Liver one-third the normal size, granular, hard, and firm.

Case XIX. Bendz.[20]—Man, aged fifty-five years. Ascites, which disappeared on treatment. Well for several months. Then ascites, œdema, and dyspnœa. Later nausea, and vomited blood. Death. *Autopsy.* Œdema of lungs. Atrophy of heart. Ascites. Liver small, hard, and granular. Portal vein to the left lobe showed fresh thrombosis. Gastric mucous membrane is diffuse, bright red, and the stomach is filled with blood. Near the pylorus the scar of an old ulcer. Blood in the intestines. Mucous membrane of the œsophagus pale. Varices in lower portion, most marked near cardia. One vein shows a longitudinal tear. Some erosion of the mucous membrane at other places. Marked periœsophageal network of veins.

Case XX. Bendz.[20]—Woman, aged thirty-one years. Had either vomited or coughed up blood several times, but was uncertain which. Pain in chest. No œdema or ascites. Some varices on abdomen. *Autopsy.* Jaundice. Heart normal; œdema of lungs; ascites. Perihepatitis. Liver small, granular, section showed parenchyma in larger and smaller lobules. Stomach full of blood; œsophagus and duodenum also. No ulcers or erosions. Varices in lower part of œsophagus, but no lesions of the mucous membrane. Bloody fluid in the intestines.

Case XXI. Marsch.[21]—Boy, aged twenty years; always well until sudden hæmatemesis, which was repeated until death, on the sixth day. *Autopsy.* Lungs and heart negative. Aorta at diaphragm enlarged about one-fourth. Liver showed marked cirrhosis. Splenic artery enlarged. Spleen and a supernumerary spleen enlarged. No further notes.

Case XXII. Smith.[22]—Man, aged twenty-three years. Moderate drinker. Long time previous vomited a large amount of dark-clotted blood. Previous to entrance, while in usual health, felt faintness and nausea and then vomited a large amount of blood. Liver extended one inch below costal arch. At site of gall-bladder oval, elastic tumor. Jaundice. Repeated melæna and hæmatemesis to death, on third day. *Autopsy.* Heart and lungs negative. Two old hydatid cysts of the liver. Right lobe of liver very small, and sections showed interstitial hepatitis.

Left lobe hypertrophied and not cirrhotic. Veins in œsophagus unusually prominent. Stomach pale except at pyloric and cardiac ends. Spleen twice the normal size. Kidneys negative. Intestines contain some blood.

Case XXIII. Ross.[23]—C. B., aged thirty-eight years. Alcoholic. Delirium tremens three times. Usual health till ten days ago. Feet and ankles swollen; abdomen soon after. No jaundice. Abdomen swollen, hard, tense, and fluctuating. Superficial veins enlarged. Liver dulness much diminished. Twelve days later repeated hæmatemesis and melæna. Death. *Autopsy.* Liver cirrhotic. Stomach and intestines full of blood. Mucous membranes show no erosions. No note as to œsophagus or spleen.

Case XXIV. Schilling.[5]—Man, aged thirty-nine years; not alcoholic or syphilitic. In January, 1882, hæmatemesis and melæna. Examination negative. In November, 1882, repeated profuse hæmatemesis. Examination negative. Death. *Autopsy.* Old perihepatitis. Liver normal size, surface uneven, increased connective tissue. Spleen three times the normal size. Varices in lower end of œsophagus, no ruptures found. Stomach contains some blood. The mucous membrane greatly loosened, much swollen, and contains a large amount of dark-red blood.

Case XXV. Leroux.[24]—B., aged forty-eight years. History of repeated hæmatemesis and melæna, unaccompanied by gastric symptoms, pain, ascites, or demonstrable change in liver or spleen. Clinical diagnosis: ulcer of the stomach. Death. *Autopsy.* Slight ascites. Liver small, granular, and hard; interstitial tissue increased. Spleen enlarged. Thrombosis of the portal vein, but more recent than the earliest hæmatemesis. No ulceration of the stomach, but there is one large ecchymotic plaque. Some blood in the stomach. No ruptured vessels. No ulceration in duodenum or œsophagus. Blood in intestines.

Case XXVI. Neligan.[25]—J. F., aged thirty-two years; alcoholic. Never sick in bed, but was formerly in the hospital, when liver was found to be small and nodular; the spleen enlarged. There was no ascites. Spit up blood once. Sudden hæmatemesis one hour previous to admission, and death three hours later. *Autopsy.* Advanced cirrhosis of the liver Spleen enlarged. Large patch of gastric mucous membrane congested with blood. No ruptured vessels found. No ascites. No note as to œsophagus.

CASE XXVII. Weisberger.[27]—J. K., aged thirty-seven years; alcohol and syphilis denied. Previous history negative until five weeks ago, when he had a severe erysipelas. Following this swelling of abdomen and legs. On entrance emaciation, dyspnœa, ascites, œdema. Lungs and heart displaced upward. Liver dulness decreased. Spleen enlarged. Hemorrhoids. Urine scanty, but otherwise negative. Repeated hæmatemesis and melæna to death, three weeks later. *Autopsy.* Granular cirrhosis of the liver. Spleen enlarged. Varicose veins in œsophagus and fundus of stomach. Rupture of vein in stomach.

CASE XXVIII. Weisberger.[27]—H. O., aged fifty-three years. Entered in October with a history of bloody diarrhœa and abdominal pain in June. Swollen feet and abdomen in August Examination shows slight cyanosis; œdema; marked ascites. Lungs and heart negative. Veins enlarged. Liver dulness normal Spleen enlarged. Bloody stools at intervals until hæmatemesis and death, eight days after entrance. *Autopsy.* Granular atrophy of the liver. Spleen enlarged. Œsophageal varices with beginning necrosis of mucous membrane. Chronic endarteritis of coronary arteries and fibrous myocarditis.

CASE XXIX. Fauvel.[28]—Man, aged thirty-nine years; syphilis at sixteen; moderate alcoholic; frequent epistaxis until puberty. Since twenty subject to diarrhœa. Suddenly in October, 1830, without known cause, abdomen became swollen and painful. Urine scanty. Diarrhæa. This lasted three weeks. In April, 1831, pain in pyloric region; abdomen swollen; œdema. Heart and lungs negative. Sudden repeated, profuse hæmatemesis. Melæna and death. *Autopsy.* Liver cirrhotic. Spleen enlarged. Ascites. Stomach enlarged, contains black blood, partly coagulated. Mucous membrane without injection or erosion. Œsophagus contains some blood. Mucous membrane of lower two-thirds elevated by varices. The vessels present dilatations and constrictions. Some places are as large as a goose-quill, but most much smaller. Walls thin. Duodenum filled with blood. No erosions.

CASE XXX. Fioupe.[29]—Woman, aged thirty-six years; not alcoholic or syphilitic. Never had malaria. Entered the hospital first for hæmatemesis preceded by gastric symptoms. Examination negative, except showing an enlarged spleen. Returned at intervals for over two years, during which time the liver gradually decreased in size, the spleen enlarged still more, and ascites appeared. Died of hemorrhage about three years after first examination. *Autopsy.* Old pericarditis. Perihepatitis. Liver small, granular, hard. Microscopically, interstitial hepatitis. Gall-bladder and ducts free. Spleen much enlarged. Stomach and intestines negative. In lower one-third of œsophagus numerous varices form a network of long meshes and end abruptly at the cardia. Mucous membrane intact. No ulceration or ecchymosis.

CASE XXXI. Hanot.[7]—Man, aged forty-three years; alcoholic. Always well until, after violent effort, profuse hæmatemesis. Next day bloody stools. Examination shows profound anæmia. Heart and lungs negative. Liver and spleen not enlarged. No ascites or abdominal varices. *Autopsy.* Heart, lungs, kidneys, and intestines negative. Stomach contains black fluid; no ulceration. Upper two-thirds of œsophagus show enormous submucous varices. Over one a small ulcer stopped with a black clot. No change in diameter of other thoracic veins. Spleen large and hard. Liver small, hard, granular. Microscope shows interstitial hepatitis.

Case XXXII. Dusaussay.[30]—A. L, male, aged thirty-six years; malaria; dysentery; alcohol. Suddenly, while in usual health and at work, vomited a large amount of blood. Repeated hæmatemesis and melæna until entrance to hospital, one week later. Examination: anæmia. Heart negative. No vomiting. Stools still bloody. Tympany. No ascites. No varices on abdominal wall. Liver normal size. Hæmatemesis and melæna at intervals until death, two years later. *Autopsy.* Anæmia. Small amount of free fluid in abdomen. Liver small; capsule thick; surface irregular; creaks on section. Spleen enlarged. In œsophagus are large varices beginning suddenly two centimetres above cardia and extending upward nine centimetres, most marked on the posterior wall, tortuous, and anastomosing freely. Three ulcers over three of these veins; two very superficial, really erosions. The other ulcer penetrates the vein, admitting a probe. Stomach contains partly clotted blood; no ulceration or abnormal vessels. Coronary vein normal. Intestines normal, but filled with blood.

Case XXXIII. Four.[31] — Catharine W., aged fifty-seven years. Icterus lasting three weeks, at twenty-two years. During the past four months frequent epistaxis. No gastric disturbances. No hemorrhoids. For the past six weeks swelling of the abdomen. Examination: ascites. Size of liver cannot be determined. Abdominal veins somewhat prominent. Spleen enlarged. Heart, lungs, and kidneys negative. Paracentesis. Six days later profuse and repeated hemorrhages and death. *Autopsy.* Liver small, hard, granular. Œsophagus shows no varices. Gastric mucous membrane negative, except for some congestion near the cardia. No ulceration or erosion. Intestines filled with blood, but otherwise negative.

Case XXXIV. Four.[31]—Henrietta F., aged fifty years; alcoholic. History of hæmatemesis three times; ascites. No subcutaneous abdominal varices. Paracentesis. Four days later death from hemorrhage. *Autopsy.* Liver red, granular, hard, small. Spleen enlarged. Large varices in lower two-thirds of œsophagus. Large vein at junction of lower and middle thirds ruptured. Stomach shows intense congestion.

Case XXXV. Lécorché.[31]—C., aged thirty-seven years. Entered unconscious with a history of hæmatemesis, but there was no vomiting after entrance. Ascites. Abdominal veins slightly enlarged. Liver seems small. Heart negative. No œdema. *Autopsy.* Ascites. Liver, small, hard, granular, abundant fibrous tissue on section. Spleen very large. Mouth, œsophagus, stomach, and intestines full of blood. Cardiac end of stomach intensely congested, but no erosion or enlarged vessel. Œsophagus: upper three-fourths, intense congestion; lower fourth, numerous varices, stopping 1.5 centimetre from cardia. Partly thrombosed. Small ulcer on one vein, through which blood can be expressed.

Case XXXVI. Debove and Courtois-Suffit.[36]—Auguste R., while in apparent health, vomits five litres of blood; no ascites. Liver dulness normal. Kidneys, heart, and lungs negative. Diagnosis: gastric ulcer. Hæmatemesis and melæna to death. *Autopsy.* Slight ascites. Liver normal size, but granular and distinctly cirrhotic. Œsophagus normal, showing no varices. Stomach contains a large amount of blood; no lesions. Intestines the same.

Case XXXVII. Debove and Courtois-Suffit.[56]—Woman, aged thirty-seven years. Classical signs of cirrhosis. Six days later vomited three litres of blood. Repeated hemorrhages to death. *Autopsy.* Ascites. Atrophic cirrhosis of the liver. Stomach and intestines contain blood, but show no lesions. Œsophagus intact.

Case XXXVIII. Debove and Courtois-Suffit.[56]—Case seen by Hanot. Man, aged thirty-five years; alcoholic. Two months ago profuse hæmatemesis. Later ascites and œdema. Death from hemorrhage. *Autopsy.* Ascites. Atrophic cirrhosis. Large amount of blood in stomach and intestines; the mucous membrane congested. Varices in œsophagus, but none ruptured.

Case XXXIX. Luzet.[35]—Man, aged thirty-four years; alcoholic; pain in abdomen; sometimes black vomit. Liver large and smooth. Hæmatemesis and death. *Autopsy.* No ascites. No lesions of gastric mucous membrane. Stomach full of blood. At cardia varices, which continue up into the lower part of the œsophagus. No ulceration.

Case XL. Hanot and Gilbert.[36]—Man, aged thirty-three years; alcoholic. In December, 1888, black vomit. February, 1889, ascites and icterus. Liver large. Death, May, 1889. *Autopsy* shows death due to gastric hemorrhage. Stomach full of blood, black and clotted. No lesion of mucous membrane. No varices in œsophagus.

Case XLI. Voelckel.[37]—F. S., aged forty-five years. Temperate habits. History of hæmatemesis at intervals for past five years. Entered unconscious. Examination negative. Diagnosis: gastric ulcer. Death. *Autopsy.* Brain, lungs, and heart negative. Mucous membrane of lower part of œsophagus bluish, veins varicose. In middle posterior wall small, hemorrhagic, infiltrated spot. Spleen enlarged. No ascites. Liver shows typical atrophic cirrhosis. Stomach and intestines negative.

Case XLII. Thibaudet.[38]—Henri D., aged fifty-eight years; not alcoholic. During a slight indisposition hæmatemesis. Examination negative. Diagnosis: gastric ulcer. Repeated hemorrhages until death, two days later. *Autopsy.* Two litres of free fluid in abdomen. Liver normal in size, but hard and granular and showing the lobules separated by bands of fibrous tissue. No point of hemorrhage in stomach or intestines. Varices in œsophagus; 5.6 centimetres below pharynx two excoriations over varicose veins. From one blood can be expressed.

Case XLIII. Tranchomme.[39]—Man, aged twenty-two years; alcoholic; ascites; no œdema; liver and spleen large; collateral circulation on abdomen. Heart, lungs, and kidneys negative. Hæmatemesis and melæna severe enough to require transfusion of salt solution; tapped twice. Death shortly after second tapping. *Autopsy.* Some ascites; œdema of lungs; heart negative; liver large, irregular, adherent, resistant; section crossed by fibrous bands; spleen enlarged.

Case XLIV. Gairdner.[40]— Woman, aged thirty-five years; alcoholic; history of repeated hæmatemesis and melæna over period of about two years. Examination: liver enlarged; dulness in left hypochondrium, but uncertain whether spleen or not; ascites. Repeated melæna, but no more hæmatemesis. *Autopsy.* Liver small, finely granular; no blood in stomach; a few hemorrhagic erosions. About the middle of the small intestines a large amount of thick, tarry material, but no break in surface of mucous membrane. No blood in large intestines; spleen normal in size; no note on the œsophagus.

Case XLV. Letulle.[41] — Chronic alcoholism; chronic dyspepsia; sudden ascites, which disappeared spontaneously. Nine months later repeated hæmatemesis; no dilatation of the subcutaneous abdominal veins; spleen enlarged; liver normal in size; death from hæmatemesis. *Autopsy.* Liver cirrhotic; spleen enlarged and hard; stomach negative; enormous œsophageal varices; diffuse ectasia with chronic endophlebitis.

Case XLVI. Oppolzer.[42 43]—Man, aged thirty-seven years; hard drinker; history of weight and fulness in epigastrium, anorexia, and constipation; emaciation; jaundice; ascites began three years ago, followed shortly by profuse hæmatemesis, which had recurred at intervals of four or five weeks, each time relieving the ascites. Final violent hemorrhage, lasting three days and causing death. *Autopsy.* Atrophic cirrhosis of liver; secondary thrombosis of portal and splenic vein; spleen three times the normal size; stomach distended with blood and showing hemorrhagic erosion at pylorus; œsophageal veins dilated.

Case XLVII. Glover.[44]—Woman, aged fifty years; drinks beer; sudden repeated, profuse hæmatemesis; emaciation; later ascites and œdema; repeated hemorrhages to death. *Autopsy.* Ascites; atrophic cirrhosis of liver; enlarged spleen; enormous submucous varices in lateral wall of œsophagus; stomach dilated and hyperæmic.

Case XLVIII. Reitman.[13]—Man, aged twenty-six years; syphilis and alcoholism denied; history of almost daily epistaxis for the past two years; pain in abdomen; some icterus; hæmatemesis; lungs and heart negative; lower border of liver dulness one finger below costal arch in nipple line. Spleen enlarged. Two weeks later ascites. Died from hæmatemesis three months later. *Autopsy.* One litre of free fluid in abdomen; liver small, granular, bile-stained; spleen enlarged; stomach contains one litre of blood; mucous membrane intact; intestines contain blood, but show no erosions; submucous veins of œsophagus enlarged somewhat, but intact.

Case XLIX. Barbier.[45]—Man, aged forty-seven years; alcoholic; anorexia; diarrhœa; pain in stomach; emaciation; repeated epistaxis; jaundice; profuse hæmatemesis; at entrance cachexia; slight ascites and œdema of legs; enlarged liver; heart and lungs negative; repeated hemorrhages; death in coma. *Autopsy.* Slight ascites; liver enormous, slightly granular, hard, bile-stained; stomach full of black, bloody fluid; mucous membrane injected; some ecchymoses; no ulceration; intestines the same; no note on spleen or œsophagus.

Case L Jones.[46]—A. B., aged fifty years; sudden hæmatemesis and melæna; nausea; anorexia; abdomen and chest negative; œdema of ankles; repeated hemorrhages to death. *Autopsy.* Heart and lungs negative; liver small, granular, hard; ascites; spleen enlarged; stomach contains a quart and a half of blood; no ulceration or abrasion, but bloodvessels of whole viscus much enlarged, enough to admit a finger.

Case LI. Black.[47]—A. O., aged twenty-six years; alcoholism and syphilis denied; general anasarca lasting eighteen months, but recently disappeared; pain in region of spleen; heart and lungs negative; liver small; spleen enlarged; one month later hæmatemesis and melæna to death. *Autopsy.* Heart and lungs negative; liver small, nodular, tough, increased fibrous tissue; spleen large and soft; stomach and intestines full of blood, but the mucous membrane is intact; parenchymatous nephritis.

Case LII. Murchison.[26]—T. B., aged fifty-three years; alcoholism; malaria. Good health until sudden, profuse hæmatemesis, which was repeated; then ascites and œdema of legs. Examination: ascites; œdema; enlarged subcutaneous abdominal veins; liver cannot be outlined; hemorrhages repeated until death, one month from the beginning of the symptoms. *Autopsy.* Ascites; perihepatitis; splenic tumor and perisplenitis; liver small and nodular, with bands of fibrous tissue; black, tarry matter in colon; no note as to cause of the hemorrhage.

Case LIII. Lancereaux.[32]—A. V., aged sixty-four years; alcoholic. For the past few months gastric disturbances, meteorismus, and scanty urine. Examination: subicteric; signs of alcoholic pseudo-tabes; liver large and smooth with sharp borders; spleen enlarged; ascites and œdema of legs; heart and lungs negative; later dyspnœa and repeated hæmatemesis and melæna. *Autopsy.* Ascites; liver weighed 1750 grammes; normal shape, surface finely and uniformly granular; microscopically, round-celled infiltration and bands of fibrous tissue about the lobules; varices in lower two-thirds of œsophagus, none ruptured; kidneys, spleen, stomach, and intestines normal.

Case LIV. Kast.[57]—Man, aged fifty-three years; for the past few weeks malaise, anorexia, and pains in the lumbar region; examination negative; sudden, profuse hæmatemesis and melæna; death next day. *Autopsy.* Advanced cirrhosis of the liver; varices in lower part of œsophagus; dark-red clot projecting from one, covering opening in vein; prominent veins under gastric mucous membrane, especially at cardia.

Case LV. Cornet.[55]—Woman, aged twenty-two years; denies alcoholism; profuse and repeated hæmatemesis; examination negative; death in thirty hours. *Autopsy.* Heart, lungs, and kidneys negative; no ascites; liver small, hard, granular; spleen large and hard; marked varices in lower 5 centimetres of œsophagus down to the cardia and extending 2 or 3 centimetres along the anterior surface of the stomach; exactly on the cardia an ulcer over an enlarged vein; mucous membrane of stomach and intestines intact.

Case LVI. Ehrhardt.[50]—L., aged forty-two years; alcoholic; began with profuse hæmatemesis while in usual health; repeated one year later; a few months later ascites appeared with pain in the right epigastrium; later decrease in size of liver and increase in size of spleen. Such symptoms continued for several years, until death from gastro-intestinal hemorrhage, eleven years after the first hæmatemesis. *Autopsy.* Heart and lungs normal; atrophic cirrhosis of the liver; splenic tumor. Careful examination of the œsophagus shows neither varices nor ulceration. Mucous membrane of stomach and intestines intact.

Case LVII. Grasset.[51]—Man, aged fifty-four years; illness began with hæmatemesis; no subjective symptoms. Examination: liver dulness small; spleen enlarged; ascites and œdema; slight enlargement of abdominal veins; repeated hæmatemesis and death in a few days. *Autopsy.* Cirrhosis of the liver; pylephlebitis adhesiva; no vascular lesions of œsophagus or stomach.

Case LVIII. Boullard.[52]—Woman, aged forty-three years; illness began with headache, dizziness, paralysis of right thumb. Three weeks later hæmatemesis and death. *Autopsy.* Stomach shows nothing to account for the hæmatemesis. Liver small, hard, resistant, irregular surface. No further post-mortem notes.

Case LIX. Raoult.[54]—Male, aged twenty-four years; alcoholism; malaria; during the past two years repeated epistaxis; past three months jaundice; no colic. Examination: well nourished; jaundice; stools alcoholic; liver enlarged, hard, slightly granular; spleen enlarged; subcutaneous abdominal veins slightly enlarged. Ten days later repeated hæmatemesis, leading to death the next day. *Autopsy.* Liver enlarged, hard, bile-stained, surface granular. Section shows an irregular arrangement of the new fibrous tissue. Spleen enlarged and hard. Varices in lower part of œsophagus, but none ruptured. Mucous membrane over small area in upper part of stomach infiltrated with blood, and 2 centimetres from the cardia a single small erosion. Intestines negative.

Case LX. Hayem.[53]—Man, aged thirty-two years; alcoholic. Illness began with severe abdominal pain, followed by vomiting, icterus, and emaciation. Frequent, abundant, black-colored fluid stools. Ascites. Non-pulsating tumor in epigastrium. Repeated hæmatemesis and black stools. *Autopsy.* Stomach contains abundant black fluid; no ulceration of gastric mucous membrane; spleen enlarged; liver irregularly lobulated, bands of fibrous tissue about the lobules.

Bibliography.

1. Wilson and Ratcliffe. Brit. Med. Journ., 1890, vol. ii. p. 1459.
2. Curveilheir et Sée. Anatomie descriptive, vol. ii. p. 116
3. Sappey. Anatomie descriptive, vol. iv. p 145.
4. Hektoen. North Amer. Pract., 1889, p. 505.
5. Schilling. Aerzt. Int. Bl. München., 1883, p. 387.
6. Saundby. Brit. Med. Journ., 1886.
7. Hanot. Bull. de la Soc. Anat., 1875.
8. Duret. Progrès Méd., 1877, p. 306.
9. Standtharner. Aerztl. Ber. d. k. k. allg. Krankenh. in Wien, 1892, p. 82.
10. Dobie. Lancet, London, 1892, vol. ii. p. 609
11. Vincent. Virginia Med. Monthly, Richmond, 1893, p. 1035
12. Rokitansky. Med. Jahrb. d. d. österi Staats, 1840, vol. xxi. p. 230.
13. Reitmann. Wien. klin Wochenschr., 1890, vol. iii. p. 379.
14. Hadden. Trans. Path. Soc., London, 1881–82. p. 190.
15. Taylor. Trans. Path. Soc. London, 1879–80, p. 119.
16. Nixon. Dublin Journ. Med. Sci., 1880, vol. lxix. p. 159.
17. Foot. Dublin Journ. Med. Sci., 1874, p. 219.
18. Minot. Boston Med. and Surg. Journ., 1872, p. 213.
19. Seymour. Boston Med. and Surg. Journ., 1883.
20. Hanz Bendz. Nord. Med. Ark., 1884, vol. xvi., No. 9. Hirsch. Jahrb., 1884, vol. ii. p. 186. Schmidt's Jahrb., vol. ccv. p. 142. Union Médicale, Paris, 1886, p. 769.
21. Marsch. Amer. Med. Times, March 10, 1862.
22. Smith. Guy's Hospital Reports, 1870, p. 517.
23. Ross. Canada Med. and Surg. Journ., 1878, vol. vii. p. 389.
24. Leroux. Progrès Méd., 1879, p. 181.
25. Neligan. Dublin Quart. Journ., vol. xvii. p. 345.
26. Murchison. Diseases of the Liver, p. 266.
27. Weisberger. Wien. kiln. Wochenschr., 1894, p. 787.
28. Fauvel. Bull de la Soc. méd. d'Obs., 1858.
29. Fioupe. Bull. de la Soc. Anat., 1874, p. 100.
30. Dusaussay. Paris Thèsis, 1877, No. 60.

31. Four. Des hémorrhagies du tube digestif dans la terminaison de la cirrhose alcoholique, Paris, 1890, No. 358.
32. Lancereaux. Bull. Med., March 23, 1890.
33. Lécorchê. Études Médicales, 1881. Maladie du Foie, p. 295.
34. Heitler. Wien. med. Presse, 1872, No. 30.
35. Luzet. Arch. de med. Exper., 1890.
36. Hanot and Gilbert. Soc. de Hosp., 1890.
37. Voelckel. Ein Fall von tödtlicher Blutung aus einer Varix des Œsophagus in Verlaufe von hepatitis intestitialis. Frankelthal, 1891. F. Albuk.
38. Thibaudet. Echo méd. Toulouse, 1890, p. 433.
39. Trachomme. Journ. de Soc. méd. de Lille, 1892, vol. ii. p. 519.
40. Gairdner. Glasgow Med. Journ., 1881, vol. xv. p. 150.
41. Letulle. Soc. méd. des hosp., Oct. 17, 1890.
42. Oppolzer: Allg. Wein. med. Ztg., 1862, p. 25.
43. Rollet. Wein. med. Wochenschr., 1866, p. 99.
44. Glover. Bull. Soc. Anat., Paris, 1889, p. 376.
45. Barbier. Progrès méd., 1883, p. 110.
46. W. D. Jones. Lancet, Feb. 29, 1868.
47. Black. Lancet, July 27, 1872.
48. Jones. Med. Times and Gazette, July, 1855.
49. Chautemps. Paris Thèsis, 1875.
50. Ehrhardt. Paris Thèsis, 1891.
51. Grasset Rev gen. de clin. et de therap., 1887, p. 162.
52. Boulland. Memoir de la Soc. med. d'emulation, 1826.
53. Hayem. Bull. de la Soc. Anat., 1869, 503.
54. Raoult. Bull. de la Soc. Anat., Decem., 1890.
55. Cornet. Loire méd. St. Etienne, 1894, p. 123.
56. Debove and Courtois-Suffit. Soc. méd. des hosp., Oct. 17, 1890: and Bull. méd., Paris, 1890, vol. iv. p. 929.
57. Kast. Hamburg Staats krankh., 1894, Heft xii.
58. Le Diberder. Recueil d. trac de la soc. med. d'obsen., 1858.
59. Audibert. Paris Thèsis, 1874, p. 146.
60. Charcot. Progrès méd., 1876, p. 703.
61. Jones. Brit. Med. Journ., 1871.
62. Habershon. Guy's Hospital Report, London, 1870, vol xv. p. 517.
63. Schmidt's Jahrbuch., vol. cl. p. 297; vol. xl. p. 178; vol. cxv. p. 33; vol. cxcl. p. 118; vol. cii. p. 289; vol. clxiv. p. 160.
64. Kundrat. Wien. med. Presse, 1886, p. 278.
65. Mosney. Union Médicale, 1857, p. 78
66. Popham. Dublin Quart. Journ. Med. Sci.. 1857, p. 485.
67. Nelsen. Bul. klin. Wochenschr , 1879, 449.
68. Thorrowgood. Lancet, April 21, 1877.
69. Ames. La Presse med. Belge., 1870, No. 36.
70. Labadie Lagrave. Maladie du Foie.
71. Eichorst. Pathologie und Therapie.
72. Strümpell. Pathologie und Therapie.
73. Osler. Practice of Medicine.
74. Loomis. Practice of Medicine.
75. Fagge. Practice of Medicine.
76. Reynolds. System of Medicine.
77. Pepper. System of Medicine.
78. Niemeyer. Pathologie and Therapie.
79. Charcot et Bouchard. Traité de Médecine.
80. Ziemssen. Band viii. Erst. Heft 167-173.
81. Virchow. Handbuch 6, Bd. i. Krankheiten d. Chylopoëtisch Syst.
82. Orth. Lehrb. d. specielle Pathologie, vol. iii. p. 176.
83. Frerich. Klin. d. Leberkrankheiten, vol. i. p. 280.
84. Klebs. Handbuch. path. Anatomie, vol. i. p. 162.
85. Rokitansky. Lehrbuch. d. path. Anat., vol. iii. p. 26.
86. Cyr. Traité pratique de maladie du Foie.
87. Harley. Treatise on Diseases of the Liver.

THE HISTOLOGY AND HISTOLOGICAL DIAGNOSIS OF ADENOMYOMATA OF THE UTERUS.*

BY JOHN COOKE HIRST, M.D.,
OF PHILADELPHIA, PA.

VON RECKLINGHAUSEN[1] has shown that the epithelial canals of adenomata and cystadenomata of the uterine and tubal walls have two sources of origin. Some arise from the canals of the Wolffian body (from its distal portion, the paroöphoron), isolated particles of which had been included in the uterus and tubes during their development in fœtal life. Others are derived from inclusions of the uterine mucous membrane—*i. e.*, from the epithelium of Müller's duct. The latter can penetrate into the uterine wall either in post-fœtal life (p. 234) or, as von Lockstaedt[2] has lately suggested, enter into the uterine or tubal wall by embryonal inclusion (pp. 26, 28). As these observations suppose the fœtal epithelial inclusions in the uterus and tubes to be derived either from the canals of the Wolffian body or the epithelium of Müller's duct, we have now to consider the question whether it is possible to discover in apparently normal uteri of new-born infants, children, or adults such congenitally displaced epithelial ducts of the Wolffian body or Müller's duct, and prove their connection with the mother tissue. All the observations hitherto made on this subject have yielded none too good results. Von Recklinghausen[1] himself (p. 151) acknowledges that he was unsuccessful in discovering in the uterine and tubal walls of new-born children remains of the Wolffian body which could be proven as part of the paroöphoron; but in three cases (Nos. 6, 24, 25) he saw isolated glandular ducts in the tubal angle of apparently tumor-free uteri of adults, and once in the uterine horn of a cow, which he considers as displaced remnants of the Wolffian body (p. 162). Ricker[3] saw, in two uteri of old women, under the serosa on the anterior surface, near the edge and near the fundus, a yellow nodule, about the size of a lentil, which lay in a trough-like depression in the uterine wall. Each nodule showed microscopically some twenty parallel canals, some straight, some corkscrewed, a certain number of which opened into the peritoneal cavity. They were lined with from one to three layers of epithelial cells, free from cilia, and were embedded in a cytogenic connective tissue, poorly provided with muscular fibres. The microscopical picture was very similar to that of the uterine mucosa. Ricker (p. 199) considers these ducts to be part of the paroöphoron, which has been entirely, or at least in part, transplanted into the uterine wall. L. Pick[4] describes displaced Wolffian canals in the wall of a double tube. In one of them, which showed macroscopically only perisalpingitis, there was discovered, at one place in the outer layers of the wall, a system of three small epithelial canals, surrounded by a concentrically arranged sheath of connective tissue (p. 185). R. Meyer[5] examined fifteen uteri of adults, the majority of which were non-myomatous—nine of children and twenty of new-born infants and of fœti which were not at full term. He found in the outer muscular layers of a uterus extirpated for cervical carcinoma, 1 to 2 cm. above the internal os, in the middle line posteriorly, several small glands, and exactly opposite them, in the anterior wall, several cysts, which also were not far from the perimetrium. The epithelium lining the cysts was cubical, and the surrounding tissue free from changes. In the uterus of a twenty-three-year-old multipara he found in the upper part of the cervix isolated cysts and glands, with cylindrical and cubical epithelium, situated more than half-way through the myometrium at the level of the internal os. These glands were in part surrounded by a regular sheath of tissue rich in round-cells and short spindle-cells, and, in addition, by a broad, circular muscular layer. The origin of these displaced glands—whether from the Wolffian body or from the embryonal mucosa—Meyer leaves in doubt. Meyer also found in a uterus with cyst-adenoma of the corpus, in which carcinomatous degeneration was beginning, several quite isolated glands in the middle and outer layers of the myometrium, which reached nearly to the perimetrium. These epithelial canals varied up to 2 cm. in length, and were provided with regular single rows of cylindrical cells. These were associated regularly with connective tissue, which was often so rich in short spindle-cells that it could have been taken for cytogenic connective tissue. In the cervix, at the level of the internal os, were two groups of small, somewhat disturbed glands, which were surrounded by a thin layer of small spindle-cells. They lay posteriorly and to one side in the outer muscular layer. Meyer regards these apparently congenitally displaced glands as canals from the Wolffian body. In the corpus uteri of new-born infants, which often shows a quite rich gland formation, Meyer saw glands penetrating deeply into the myometrium, very much branched or cystic, and some completely cut off from the endometrium. Again, he found in the fundus uteri of a fœtus of nine months a tubular gland in the middle of the myometrium, surrounded by typical cytogenic tissue, and, as his illustration shows, very probably a result of one of these projections of the endometrium. A broad band of myometrium separates this isolated gland from the mucosa; from the serosa, on the other hand, it is separated by only the outermost muscular layer, which is actually pushed forward to form a slight prominence by the gland it contains. The majority of the authors who have made observations on this subject have left the results of their work partly undecided, partly not absolutely demonstrated, while a part is, I think, incorrect, especially the so-called displaced paroöphoron in Ricker's case, to which I will return later. We can accept the inclusions of uterine mucosa in the uterine wall of a new-born infant described by Meyer as proven, so that the unquestioned discoveries narrow down to this one case.

---

* From Prof. L. Landau's Frauenklinik, Berlin, 1899.

In all these observations it has been indeed proven that there can be and are epithelial inclusions derived from the Wolffian body or Müller's duct, but in no case has it been proven or even made probable that these inclusions could in time have developed into adenomyomata. I wish, therefore, to make a report of certain observations made during my course of study in the laboratory of Professor Leopold Landau's clinic in Berlin, in which I was assisted by Dr. L. Pick, the chief of the laboratory. Professor Landau very kindly gave me permission to publish the results.

Close under the serosa of the uterus, in this case an apparently tumor-free one of an adult, were found isolated glands of the mucous membrane; and we were able, in certain of these glands, to follow them in every stage of development up to the complete formation of the first stage of adenomyoma. At the same time we were able, from the morphology of these glands, to formulate certain rules which can be applied to all future cases as well for the differential histological diagnosis of embryonal epithelial inclusions from the Wolffian body and Müller's duct.

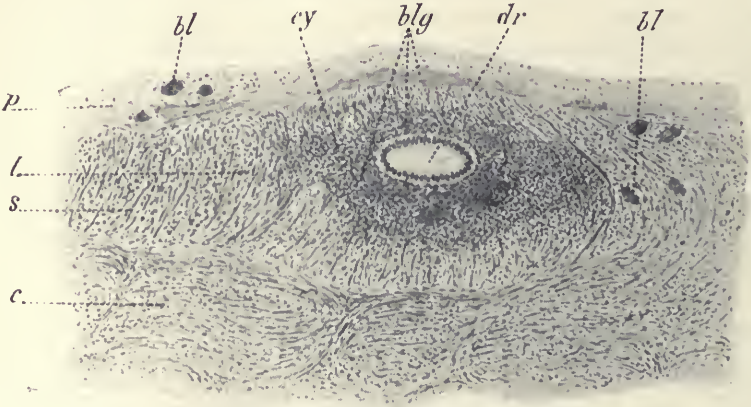
The history of the case is as follows:

Frau S., aged forty-five years, was admitted to the clinic on May 7, 1897. Up to the middle of the preceding year the patient had always been healthy. Menses regular. From July, 1896, she missed several periods, and then began to bleed severely. She was curetted and also treated by internal medication, without any permanent results. This bleeding continued with slight intermissions, and in the five weeks preceding her admission to the clinic was particularly severe. She complained of pain in her lower abdomen and of weakness in her legs. Her appearance was very anæmic, vagina fairly capacious, portio broad, with an old tear, and blood was exuding quite freely from the external os. Uterus was large, anteflexed, and on the left side the ovary could be palpated. Operation, May 8, 1897, under ether anæsthesia. An uncomplicated vaginal hysterectomy by Professor Landau's method. It was slightly difficult to deliver the uterus from the peritoneal cavity. Her convalescence was uninterrupted and uneventful, and she remains well up to the present time.

Anatomical Examination. Left adnexæ were attached to uterus, the right having been removed separately. Both tubes were 6.5 cm. long, ovaries small, with several adhesions around them. The uterus was large, thick, 10 cm. long. The breadth between tubal insertions was 6.5 cm. The mucous membrane of the portio was smooth, yellowish-red. Posteriorly in cervix a deep tear. The uterus was next cut open throughout its whole length anteriorly in the middle line. The cervix was 2.75 cm. long, mucous membrane smooth, myometrium 13 mm. thick. The cavity of the uterus was 4.75 cm. long, lined in the lower half by atrophic, in the upper half by deep red, slightly villous hypertrophic endometrium. The myometrium of the corpus was soft and 2.5 cm. thick. The perimetrium was thickened, and on the dorsum of the uterus, from the fundus to the level of the internal os, quite extensively changed. Here was a network of white bands of thickened peritoneum, which were all the more prominent from lying on a deeply injected background. At certain places a more ray-like formation took the place of the raised bands, so that one received the impression of a kind of "scar" on the perimetrium, and arising from these areas were delicate shreds and filaments, the remains of old perimetric adhesions.

Here and there between these bands were small miliary cysts, which had a bluish color and appeared like small shot through their white covering. There were no large cysts. The remainder of the serous coat of the uterus was smooth, with remnants of adhesions anteriorly on the left side; the tubal angles and the myometrium (on section) free from abnormalities. The organ was hardened first in formol—Müller's fluid (Orth)—and then in alcohol of increasing strength. For the microscopical examination a flat, horizontal section of the entire thickness of the corpus was cut out and embedded in celloidin. Sections from this portion were stained in alum carmine and hemalaun eosin.

FIG. 1.



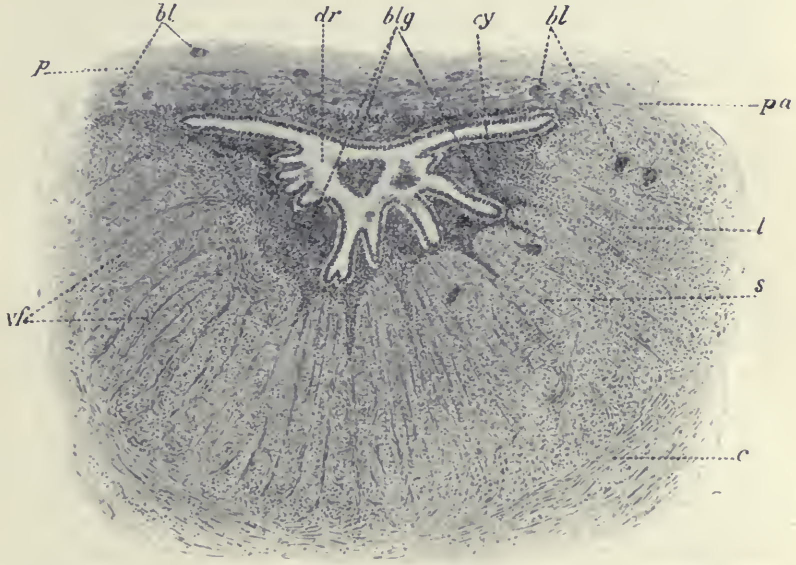
Horizontal section from the central portion of the uterine dorsum.

p. Perimetrium.
l. Subserous layer, with longitudinal fibres.
s. Sagittal septa in longitudinal layer.
c. Supravascular stratum, chiefly circular in course.
bl. Distended bloodvessels in peritoneum and longitudinal layer, mostly capillary and in cross-section.
blg. Hemorrhages.
dr. Cross-section of gland in longitudinal layer. One layer of cylindrical cells. To one side oblique position of muscle-bundles of the septa.
cy. Cytogenic connective tissue. Gland completely isolated by bleeding.

The endometrium shows some increase in the number of glands, which are sometimes cystic, sometimes globular, ovoid, or of other irregular forms. The single layer of cylindrical epithelium shows occasionally cilia, and is much flattened out at several places. The cysts and glands contained blood, cast-off cells, hyaline bodies, and detritus of various kinds. In the stroma are many fully filled capillaries and small hemorrhages, which are more copious toward the surface, and also diffused round-celled infiltration near the surface.

The surface epithelium is almost everywhere wanting, and the glands only penetrate into the most superficial layers of the myometrium. Otherwise the whole myometrium, which shows much connective tissue in the vascular layer, and especially in the vessel walls, is free from glandular or any other epithelial inclusions up to the outer edge, bundles of which are divided into comparatively large compartments by fine septa running in the horizontal plane of the section (*s*). Between this layer and the vascular stratum is a second layer (*c*) running in a circular direction and quite sharply differentiated from the rest.

Fig. 2.



Cut from same place as Fig. 1.

p. Perimetrium.
dr. Ramified gland, branches centripetal, single layer cylindrical epithelium.
bl. Fully filled capillary bloodvessels.
blg. Hemorrhages.
cy. Cytogenic connective tissue, accompanying the branches of gland.
l. Lamellæ of longitudinal subserous stratum.
s. Septa of same.
vf. Arched bands connecting the septa.
c. Supravascular stratum; circular limit of the fan-shaped radiation.
pa. Muscular layer, arising from the frontal position of septa, parallel to surface.

The first layer, and also the somewhat thickened peritoneum, corresponds to the middle of the dorsum of the uterus. At this place we find several noteworthy points. Above the vascular layer, throughout the whole section, we can recognize quite plainly two muscle layers running in different directions (Fig. 1). One longitudinal layer (*l*), the large number of filled capillaries (*bl*), the majority of which have been cut in cross-section. Here and there we find small hemorrhages (*blg*). In these two muscular layers (*i. e.*, the longitudinal and circular) we find, especially in the former, a number of epithelial inclusions. These are somewhat dilated, more or less round (*dr*) in shape, varying from microscopic (70μ in diameter) to macroscopic (225 to 285μ in diameter) size; sometimes collapsed, sometimes pronged, and sometimes branched, the majority of the ramifications pointing toward the cavity of the uterus. (See Fig. 2.) On the whole, they are not numerous, and are scattered, nearly always isolated, but confined to the central part of the dorsum uteri. They are lined with one uniform layer of cylindrical epithelial cells, seldom ciliated (see Figs. 1 and 2), about 25μ in height, which have a large plasma body and a nucleus almost filling the lower part of the cell. Some of the smaller glands lie naked in the muscle wall, but nearly all are surrounded by a tissue which is perfectly typical for the stroma of the uterine mucous membrane—*i. e.*, cytogenic or lymphadenoid tissue. This tissue penetrates into the myometrium accompanying the branches of the gland and parallel to them (Fig. 2). Only very rarely do two glands lie so close together that the cytogenic tissue of one mingles with that of the other.

Often this cytogenic tissue, like the surrounding myometrium, contains capillaries filled almost to bursting, and it sometimes happens that one of the glands, by the bursting of a capillary, is surrounded by a broad belt of blood, and cut off, like an island, from the surrounding myometrium (Fig. 1).

In such glands the epithelium, on account of the disturbance of its nutrition, is sometimes flatter, poorly developed, or swollen and diffusely stained.

The complete separation of these large branched gland formations from their nutrient stroma is never seen; but, nevertheless, several of these epithelial tubes are lifted up from their cytogenic tissue by the hematomata (Fig. 2). Here and there in the neighborhood of these hemorrhages we see the formation of flakes of brownish-yellow pigment; or we see in the canals themselves hyaline bodies, leucocytes, epithelial cell nuclei, and large, round pigment bodies filled with brownish-yellow granules.

The arrangement of the myometrium around these epithelial inclusions is very interesting. Only some of the very small ones stand naked in the circular layer already referred to (Fig. 1, *c*). The vast majority are found only in the lower longitudinal layer (Fig. 1, *e*); of the latter a part, without seeming to influence in the least the direction or apposition of the muscle-fibres, penetrate up to the peritoneal surface, and are separated from the serosa by only a thin layer of connective tissue (Fig. 1). Others, mostly round or ovoid, have taken such a position in the longitudinal muscular layer that the longitudinal lamellæ diverge in a fan-shaped manner toward the uterine cavity, and converge toward the serosa into a band running parallel to the surface. The muscle-fibres also are plainly in much closer apposition at this point than at other points in the neighborhood. The picture given on cross-section is a fan-shaped radiation of these muscle bundles in the direction of the uterine cavity (Fig. 2), while toward the serosa, by a constantly increasing convergence of these bundles, a circular band has been formed, covering the epithelial inclusions. The longitudinal layer is not only passively crowded out of shape by these inclusions, but is also actively changed in direction. These epithelial inclusions have, at one point, produced an actual thickening of the muscle bundles of the longitudinal layer, and at the same time a change in their course. The fan-shaped arrangement of these bundles is everywhere plainly indicated by the system of muscular septa lying in the horizontal plane of section (Fig. 2); the change affects only the longitudinal layer, while the underlying circular layer forms everywhere a sharp boundary (Fig. 2, *c*), so that the whole proliferation is comparatively circumscribed. This proliferation of the longitudinal muscle layer is best seen at the points where we have large, ramified glands (Fig. 2). Corresponding to the finger-like ramifications of these glands—the processes pointing toward the uterine cavity—and their cytogenic sheath (Fig. 2, *cy*) we have three ray-like bands or septa (Fig. 2, *s*), and between them either the longitudinal fascicles preserved intact, or with bridging bands of muscle-fibres (Fig. 2, *vf*) connecting two neighboring septa.

Toward the uterine cavity the boundary is formed by the supravascular circular muscle layer; toward the perimetrium, where the branches of glands do not extend, the thickened septa (Fig. 2, *s*) have formed themselves into a somewhat narrow band covering in the glandular inclusions (Fig. 2, *pa*). In spite of all these inclusions and new formations there is nowhere an elevation of the surface of the organ. It cannot be said either that a great part of the perimetrial changes can be traced to these epithelial formations. One does indeed find, directly over the position of some of these many-branched glands, hemorrhagic fibrous perimetritis, but this is also absent over others of these glands, and occurs, too, without their presence.

We have to deal, then, with a uterus with symmetrically hyperplastic myometrium—an endometrium hyperplastic in some places and atrophic in others—and a chronic perimetritis, with adhesions, chiefly on the dorsum of the uterus. The tubes and ovaries are atrophic, but show traces of previous inflammation. About the centre of the dorsal surface we find in the supravascular and longitudinal subserous layers, but especially in the latter, epithelial glandular formations, some cystic or tubular, others somewhat branched and quite isolated, which exert an influence in proportion to their number of branches upon the direction and apposition of the muscle bundles in the layers that contain them. They are almost invariably surrounded by a typical lymphadenoid (cytogenic) stroma. The entire remaining myometrium is free from glands, and those of the hyperplastic endometrium penetrate only into the most superficial layer of the muscular wall. As these heterotopic epithelial inclusions cannot be considered as derived directly from a glandular hyperplasia, and as there cannot have been either in the uterus or anywhere else in the body a growth giving metastasis (adenomatous)—the patient has been absolutely well since the operation—the glands must have arrived at their present location by a process of embryonal aberration, being without a doubt derived from Müller's duct, and not from the Wolffian body. This is shown, I think, by the cytogenic or lymph-adenoid tissue which surrounds the almost isolated or very much scattered glands and cysts. It is well known that this characteristic cytogenic tissue, so rich in small spindle-cells and round-cells, is entirely wanting in normal remains of the Wolffian body. It is likewise not to be found in the epoöphoron or paroöphoron or the corresponding Giralde's organ in the male (von Recklinghausen,[1] p. 118). In such organic remains the surrounding sheath of the epithelial canals is, in addition to the muscle-fibres, composed of connective tissue rich in fibres and poor in cells. This sheath is invariably found around the tubules and cysts of the adenomyomata of the paroöphoron, when these are not yet hyperplastic to any marked degree—the so-called "scattered arrangement," as, for example, in the small, hard adenomyomata of the paroöphoron, found at the tubal angles and in the tube itself. However, as soon as any marked proliferation of these canals of the Wolffian body takes place, as soon as we have a true adenoma with a system of glands and canals, in the so-called "compact arrangement"—*i. e.*, arranged in groups and clusters—the ground substance of the connective tissue, hitherto poor in cells, develops into cytogenic tissue. This change is in direct ratio to the proliferation of the glands. This dependence of one upon the other is carried to such an extent that when a single canal shoots forth like a branch from a complex gland, which lies embedded in the cytogenic connective tissue, the proportion of cells in the cytogenic tissue immediately sinks, while the proportion of fibres rises (pp. 105 to 107). This remarkable relation of the cytogenic and simple fibrous connective tissue to the "compact" and "scattered" arrangement of the canals of the Wolffian body is not confined, as von Recklinghausen (p. 171) supposed, to tumors in the uterus alone. As L. Pick[6] has shown, cytogenic tissue is always found around the epithelial canals in adenomyomata of the paroöphoron wherever they may occur—in the fornix and groin, for example—as soon as the embedded canals of the Wolffian body form in compact arrangement (*i. e.*, proliferate), and is invariably absent when they are very little or not at all proliferated. *Vice versa*, when we have isolated or scattered epithelial canals or cysts, and the question arises as to whether they are derived from the endometrium (Müller's duct) or the Wolffian body, they must, if embedded in cytogenic tissue, be derived from the epithelium of the endometrium of the uterine body. We can find cytogenic tissue in the uterine mucous membrane of a newborn infant, even though it contains very few if any glands. For these reasons I consider the isolated epithelial canals in the case under discussion to be derived from the glands of the corporal endometrium, and that they could only have arrived at their present position by a process of inclusion during embryonal life.

It is more probable, I think, that these inclusions occurred early in fœtal life by the aberration of an epithelial sprout from Müller's duct rather than at a later period by an ingrowth of a gland or glands, and subsequent atrophy of their epithelial pedicle; for we find small, delicate ducts lying naked in the muscle tissue, or with tiny connective tissue sheaths, which must be considered as young products of the included glands, whose development is only beginning. In any case they show that isolated included glands do not invariably possess a cytogenic connective tissue sheath; but this latter is always present when they are proliferated, just as in adenomatous proliferation of the remains of the Wolffian body.

When we analyze critically, from this point of view, the observations on this subject which we have considered in the early part of this paper, and which have been published under the name of canals of the Wolffian body or Müller's duct, forming inclusions in the uterus and tubes, we arrive at the following conclusions: The isolated gland which Meyer found in the myometrium of the fundus has a cytogenic connective tissue sheath; therefore it is, as is confirmed by its other relations, and as Meyer says, an included epithelial gland from the corporal mucous membrane. Single isolated glandular ducts, surrounded by a sheath of fibrous connective tissue poor in cells, such as von Recklinghausen found at the tubal orifice in an apparently tumor-free uterus, and in the uterine cornu of a cow, and L. Pick found in the wall of a double tube, have been accepted by these authors as canals from the Wolffian body —very possibly correctly—but they might also be isolated epithelial canals from Müller's duct. The localization at the tubal orifice is not entirely satisfactory proof.

In Meyer's case the mucous membrane glands were situated in the fundus, and in our case in the dorsal part of the uterus; so that both times they were exactly in the seats of predilection for inclusions of the Wolffian body. The offshoots from Müller's duct can thus appear at any place (L. Pick,[6] p. 470), just as the derivations from the Wolffian body are not confined to any one definite locality. The same doubt as to whether the inclusions are from the Wolffian body or are uterine glands could be entertained in Meyer's third case, already referred to (combination of cystadenoma of the mucous membrane with beginning carcinomatous degeneration, and congenitally included glands, probably from the Wolffian body). In the other two cases Meyer himself leaves the origin of these inclusions in doubt.

The supposition of Ricker, that the formations he described in the uterine wall are wholly or partly transferred *normal* paroöphoron, is, I think, untenable. Von Lockstaedt[2] (pp. 30, 31) has rightly protested against it. As the histological picture of these formations presents very characteristically "that of the uterine mucous membrane"—*i. e.*, as these glandular ducts are embedded in cytogenic tissue, we can have to deal only with proliferated or non-proliferated corpus mucous membrane or *proliferated* and *adenomatous* paroöphoron ducts, certainly not with the normal paroöphoron or any part of it. The assertion of Ricker that the remains of the Wolffian body are sheathed with connective tissue rich in cells is not correct. If in Ricker's case an adenoma is really out of the question, we can have nothing else than aberrant mucosa corporis.

Von Lockstaedt was, I think, right in considering the free opening into the peritoneal cavity of the ducts in Ricker's preparation a secondary perforation. An incorporation of real and undisputed parts of the paroöphoron in the wall of the tubes or uterus has not yet been fully proven. As these uterine glands, as soon as their cytogenic sheath is wanting, have exactly the same appearance as aberrant remains of the Wolffian body, and can appear in precisely the same places, we can diagnose these remains as from the paroöphoron only when they retain their connection with the Wolffian (Gaertner's) duct, or have preserved a form absolutely typical of heterotopic portions of the Wolffian body. Otherwise they show precisely the same anatomically undiagnostic characteristics (L. Pick,[6] p. 505) as the adenomata in the uterus or tubes without specific figures of the Wolffian body or without demonstrable connection with Gaertner's duct. On the other hand, adenomata which contain non-proliferating epithelial glands and cysts in scattered arrangement are to be classified as derived from the mucous membrane as soon as the sheath around the glands is without doubt composed of cytogenic tissue (von Lockstaedt,[2] Cases I. and III.). In our case I wish to call attention to the rich blood-supply of the cytogenic sheaths and the numerous hemorrhages in them as well as in the surrounding muscular tissue. In some of the canals were found the same large, round pigment bodies which von Recklinghausen has shown as being often present in adenomata of the paroöphoron (von Recklinghausen,[1] pp. 99, 123); but von Recklinghausen himself says that these pigment cells have no diagnostic value as to the origin of the adenomata. In our case the periglandular bleeding has effected a separation of several glands from their surroundings. Their nutrition is cut off, and the epithelial cells plainly show signs of degeneration.

Those adenomata, the glands of which penetrate up to the serosa, show, according to von Recklinghausen, well-marked formation of connective tissue and adhesions at the place in question. Inasmuch as in our case the glands were found principally at places where there was quite a severe perimetritis, it would seem to apply here as well. Nevertheless, we could comparatively frequently demonstrate a perimetritis at a place free from glands, and glands at a place where perimetritis was absent; and, besides, as the dorsum of the uterus, where these inclusions were found, is, in the majority of cases, the seat of predilection of perimetritis, this association would seem to be nothing more than a coincidence.

Another point I wish to call attention to is the position of these isolated corpus glands in the outermost subserous longitudinal muscular layer. Only very few are found in the circular supravascular layer. The close relation between the epithelial inclusions and their muscular surrounding layer is also noteworthy. In a certain number this relation is not very marked; in the rest, however, more especially in the branched forms, it is most clearly indicated. At such points the longitudinal septa (Fig. 2) have arranged themselves in a fan-shaped manner, like rays, converging toward the glandular canal and its branches, and the whole surrounding muscular layer has become more dense through proliferation; the gland and its sheath stand out from the subserous muscular layer as a quite plainly circumscribed adenoma. It is thus shown by this case that these isolated epithelial inclusions are capable of forming adenomyomata, and, indeed, as von Recklinghausen has suggested for the smaller adenomyomata of the paroöphoron occurring in the uterine body, they play the chief part in the proliferation of the muscular sheath which surrounds them. If R. Meyer had concluded, theoretically, from his investigations, that an adenomyoma arising from embryonically included offshoots from the mucous membrane, even when in the peripheral layer of the uterus, could not be proven offhand, our observations would fully bear them out.

I shall briefly summarize the main points in the foregoing as follows:

1. In the uterus of an adult were found embryonal epithelial inclusions from the mucous membrane of the uterine body (Müller's duct), situated in the peripheral subserous layer of the myometrium.

2. Isolated glands and cysts, included in the uterine wall and originating from the mucous membrane, are provided with a cytogenic tissue sheath, but not invariably.

3. This cytogenic tissue is found accompanying remains of the Wolffian body *only* when adenomatous proliferation is present in them; and this applies both when it occurs at the normal site of the paroöphoron and in transposed portions of it.

4. Adenomata with glands and cysts *in scattered arrangement* are to be considered as from the mucous membrane as soon as they are provided with cytogenic tissue sheaths around the glands.

5. The epithelial ducts in the uterine and tubal wall, which have heretofore been characterized as aberrant canals from the Wolffian body, have not been proven as such, and are of uncharacteristic anatomical structure. For this diagnosis we must have specific figures of the paroöphoron or connection with Gaertner's duct.

6. We have shown that the formation of subserous adenomyomata from these incorporated glands of the uterine mucous membrane is possible.

BIBLIOGRAPHY.

1. von Recklinghausen. Die Adenome und Cystadenome der Uterus and Tuben-wandung. Berlin, 1896.

2. von Lockstaedt, Paul. Ueber Vorkommen und Bedentung von Drüsenschlaeuchen in der Myomen des Uterus. Inaug. Dissert., Koenigsberg, 1898.

3. Ricker, Gustav. Beiträge zur Aëtiologie der Uterus-geschwuelste. Virchow's Archiv. vol. cxlii. p. 193.

4. Pick, L. Ein newer Typus des voluminoesen paroöphoralen Adenomoms, etc. Archiv für Gynäkol., vol. liv, part i. p. 117.

5. Meyer, R. Ueber die Genese der Cystadenome and Adenome des Uterus. Zeitschr. für Geburtsh., vol. xxxvii. p. 327.

6. Pick, Ludwig. Die Adenomyone der Leistengegend und des hintern Scheiden-gewölbes. Archiv f. Gynäkologie, vol. lvii. part ii. page 461 *et seq.*

A CASE OF TRAUMATIC VARIX OF THE ORBIT IN WHICH LIGATION OF THE LEFT COMMON CAROTID ARTERY WAS SUCCESSFULLY PERFORMED.[1]

By Charles A. Oliver, A.M., M.D.,
ATTENDING SURGEON TO THE WILLS EYE HOSPITAL; OPHTHALMIC SURGEON TO THE PHILADELPHIA HOSPITAL.

On July 9, 1894, T. T., a twenty-seven-year-old brakeman, came to my clinic at Wills Eye Hospital with the history that five days previously his left eye had been either kicked or struck with a fist. For two days after the injury he did not notice anything peculiar, but on the third day the eyelids became much swollen, and on the fourth day the eyeball became prominent. This was followed by a "constant buzzing, with some pain," which the patient referred chiefly to the left temporal and auditory regions.

The man was in a highly nervous state, with marked tremor, especially of the extremities, he having just passed through a subacute attack of alcoholism of nearly three weeks' standing.

Examination of the affected eye and its surrounding parts showed that the upper lid was so much swollen and œdematous that it fell over in front of the eyeball. There was an intense chemosis of the ocular conjunctiva, which was so pronounced in its inferior half as to allow a broad fold of the membrane to project through the palpebral fissure and rest upon the skin of the lower lid. The globe itself, which, with the exception of a slight wheel-like motion down and in, was immobile, could be rotated a few degrees in different directions by forced palpation. The organ was proptosed directly forward. Its cornea was clear. The pupil was three millimetres in diameter. There was absolutely no movement of the iris to any form of direct or consensual impulse. Intraocular tension was normal, and there was not any ciliary tenderness.

Vision was reduced to one-eighth of normal, this being in a measure accounted for by a history of convergent strabismus which had existed since infancy, the sight of the left eye always having been defective.

---

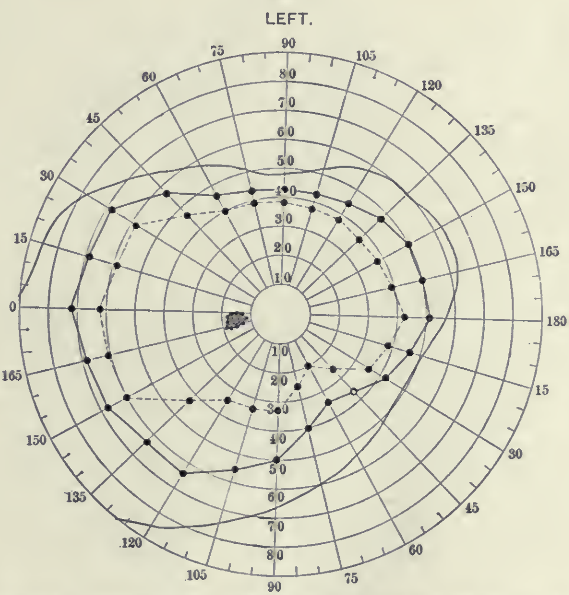
[1] Read before the December, 1899, meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia.

The patient stated that when he was four years of age he was caught between two railroad cars, inflicting such an injury to his head that he bled from the mouth, the nose, and the ears.

The fields of vision for white and red of the affected eye, as shown in Fig. 1, exhibited decided indentations in the lower inner quadrants, with a slight enlargement of the physiological blind spot.

Ophthalmoscopic examination showed that the retinal veins were enlarged and tortuous, while the contained venous currents were so dark in places as to appear almost black. No hemorrhage of any kind could be determined. A marked bruit in the temporal region, which was synchronous with the radial pulse, could be plainly recognized by direct auscultation. No orbital bruit or pulsation could be either heard or felt.

FIG. 1.



Fields of vision for one centimetre diameter each white and red at thirty-five centimetres distance. (The outer continuous line shows extent of normal field. The heavily dotted continuous line shows extent of field for white. The heavily dotted broken line shows extent of field for red.)

When the left common carotid artery during its passage through the neck was forcibly compressed for a brief period of time by the finger-tips, the affected eye slowly sank into place only to resume its former false position the moment that the pressure was removed; while some of the palpebral and conjunctival stasis subsided.

The right eye was healthy and normal in all respects.

For the purposes of further study I immediately admitted the man into the wards of the hospital. In two days' time both the palpebral and the conjunctival chemosis had become greater and the proptosis had become more marked. Constant digital and mechanical compression upon the left common carotid artery was then decided upon and faithfully, though uselessly, persisted in for a period of eleven days, the external conditions becoming much worse and the bruit so intense as to be rendered almost unbearable to the patient. Ophthalmoscopic examination at this time showed that the retinal veins of the affected organ were much more swollen than they were when the patient was admitted into the hospital.

At this juncture, as I was about to leave the city for my summer vacation, I left the case in charge of Dr. George C. Harlan, one of my colleagues at the hospital, we agreeing that a radical operation for the relief of the condition should be tried at once.

Just before his dismissal from the hospital to go to the surgical wards of the Pennsylvania Hospital, to which institution he was sent by Dr. Harlan, he complained of pain in the left ear and upper jaw, both of which had become markedly swollen. The cornea of the affected eye was becoming hazy in its deeper layers, allowing but a dim view of the fundus. The retinal veins were enormously dilated and tortuous, while the retina itself was quite opaque in places.

On August 3d the left common carotid artery was tied by Dr. Thomas S. K. Morton, of this city.

Under ether-narcosis an incision was made in the line of the sternomastoid muscle on the left side of the patient's neck, and the common carotid artery was exposed at the point of election above its crossing by the omohyoid muscle Pressure upon the elevated vessel at this point entirely controlled the bruit and pulsation. The vessel was tied by a treble ligature after the manner suggested by Ballance and Edmunds. This ligature consisted of three large strands of twisted silk being passed about the vessel. Each strand was tied tightly down by one knot, after which all six of the ends were tied in a second knot, thus cutting off and bringing into apposition almost a quarter of an inch of the coats of the vessel. The wound was closed by a continuous silk thread. No drainage was employed.

Not the slightest symptom of so large an artery having been ligated followed the procedure, there being an entire cessation of the pulsation and the bruit. The eye immediately settled back into the orbit, and nothing remained to denote the former condition save a pouch of conjunctiva which projected from the lower lid.

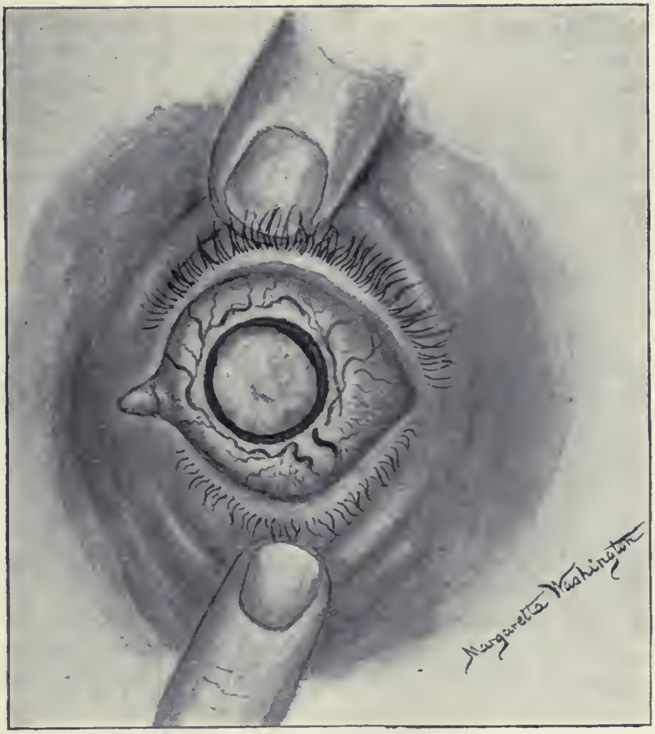
Five hours after the operation Dr. William C. Posey, my assistant at Wills Eye Hospital, kindly saw the case for me. Both the bruit and the exophthalmos had greatly diminished. The eye-ground could be more distinctly seen, the retinal veins not being so distended as they were before the operation. Uncorrected vision equalled one-tenth of normal.

Six days later the exophthalmos had much lessened and the palpebral œdema and the conjunctival chemosis had greatly subsided, allowing the patient to elevate the upper lid and to have some control over the movements of the eyeball. The retinal veins were not swollen. For the first time a few points of retinal extravasation in direct association with the veins could be determined. Vision was the same as when the patient was seen before.

On January 27, 1896, some five months after the operation for ligation, he returned to the hospital with the statement that the eye had gradually become blind, and that it took several weeks' time for the swelling of the lids and conjunctiva to disappear.

At this time it was found that the eyeball was convergent, and as can be seen in Fig. 2, which is reproduced from a water-color sketch made for me by Miss Margaretta Washington, of this city, the scleral veins were enlarged, the cornea was clear, the pupil was widely dilated, the anterior chamber was shallow with almost total obliteration of its angle, and the lens was cataractous. Intraocular tension was increased, and the eye was absolutely blind. There was no ciliary tenderness. In other words, the condition of an absolute secondary glaucoma was present. The fellow eye continued normal.

Fig. 2.



External appearances of condition of absolute secondary glaucoma.

Remarks. The head-crush at four years of age most probably was the beginning of either an aneurismal varix situated between the petrous and the cavernous portions of the internal carotid artery and the corresponding cavernous sinus, or a varicose aneurism in which there was an intervening sac or so-called false aneurismal connection located between the two vascular channels. In either case in a well-protected situation and the connected veins subject to but little arterial pressure, it—as in all such forms of vascular disturbance—was of very slow growth and may have even terminated its extending process.

The more recent blow upon the diseased region in a debilitated subject—given to alcoholic excesses, most probably—increased the opening into the venous structures so as to give as its most prominent ophthalmic sign an orbital varix.

The cessation of the gross venous stasis of the related vascular structures of the orbit, and the eyeball and its appendages, by ligation of the main trunk supplying blood to the parts, is of interest both in regard to therapy and etiology. The appearance of the signs of absolute secondary glaucoma as the final outcome of the condition of the ocular tissues may be in a measure understood when it is considered that the eyeball is a lymph-producing organ which is dependent upon normal blood-supply.

THE EHRLICH DIAZO REACTION.

By James R. Arneill, A.B., M.D.,
INSTRUCTOR IN CLINICAL MEDICINE.

(*From the Medical Clinic of the University of Michigan—Professor Dock.*)

In a preliminary report of the commission appointed by Surgeon-General Sternberg to investigate typhoid fever during the late war, Vaughan states that the chief difficulty with which the commission had to contend was the utter worthlessness in numerous instances of the diagnoses of the volunteer physicians. As a result of inability and lack of opportunity to make blood examinations for plasmodia malaria and Widal's test for typhoid fever, thousands of cases of typhoid fever were diagnosed malaria, typho-malaria, continued fever, dengue, indigestion, and diarrhœa, and treated as such.

It may seem an extravagant statement, but it is none the less true, that if the diazo test had been applied in a routine way, and alone depended upon for the diagnosis of typhoid fever, the vast majority of these cases would have been correctly diagnosed.

Before recording my observations and deductions in detail, I will give a short résumé of the history and the chemistry of the diazo reaction.

In 1860, Peter Griess discovered and produced the azo dyes. He early made use of sulphanilic acid and naphthylamin salts for the demonstration of nitrous acid and its salts by means of color reactions. In 1875 the chemist Weselsky demonstrated phloroglucin by combining it with nitrodiazobenzol, the product being a red dye. Ehrlich believed that in the urine of certain diseases aromatic bodies were excreted which would become diazotized under proper chemical treatment. With this idea in mind, in 1882 he experimented upon the urines of a large number of infectious and non-infectious diseases, and obtained a specific diazo reaction, especially in the urines of typhoid fever and tuberculosis. Unfortunately, in his earlier contributions Ehrlich gave very meagre and unsatisfactory directions regarding the preparation of his reagents, with the result that different investigators of ability experimented in a blind way with the test and arrived at erroneous conclusions. Penzoldt, Petri, and von Jaksch declared that it could be obtained in numberless diseases and conditions, even in normal urine; that all sorts of bodies, such as grape-sugar, acetone, bile-coloring matter, and a number of medicines would give the same reaction, and considered the test worthless as a prognostic and diagnostic measure. Among American authors Munson and Oertel deny its diagnostic worth, claiming that diacetic acid is the cause of the test, and that its diagnostic and clinical significance must be identical with the ferric chloride test. Instead of using a ½ per cent. solution of sodium nitrite, as recommended by Ehrlich, these investigators used as high as a 5 per cent. solution. Greene found that when he used a concentrated solution of sodium nitrite a reaction similar to the diazo was obtained even in normal urine.

Mistakes were also made in the interpretation of the test. Edwards regarded the junction-ring — eosin to garnet—as the Ehrlich diazo reaction, and found it in so great a variety of diseases and conditions that he considered it useless as a diagnostic or prognostic sign. Edwards made the fatal mistake of disregarding the crucial part of the test, the color of the foam. Every investigator of experience is familiar with the fact that a red ring of varying tint is obtained in countless diseases. This, however, is no more the Ehrlich diazo test than a colored precipitate is Fehling's test.

A misunderstanding as to the exact color of ring and foam necessary for the production of a genuine Ehrlich diazo reaction has perhaps been the most prolific source of error. Burghart, for instance, claims that if tincture of opium, cascara sagrada, or hydrastis canadensis be added to urine a reaction similar to the diazo is obtained. I experimented with these drugs and found that the only one which suggested in color the diazo reaction at all was tincture of opium, which gave a salmon tint to the foam. When these drugs are taken in medicinal doses and excreted in the urine the author says there is no possibility of mistaking the reaction for the Ehrlich diazo reaction. A large number of our patients have taken cascara for weeks at a time without giving the reaction. It has been claimed that the end-products of certain medicines excreted in the urine give the diazo reaction. It is true that such substances as aniline, naphthalin, phenacetin, lactophenin, and orthoform give a color reaction when treated with the diazo reagents. This has been called by a few authors the Ehrlich diazo reaction. These were diazo reactions, but not the Ehrlich diazo reactions. At the beginning of this article I wish to emphasize the distinction between diazo reactions and the Ehrlich diazo reaction. There are a large number of diazo reactions which are used to demonstrate certain known substances, such as phloroglucin, acetone, bilirubin, naphthalin, grape-sugar, peptone, and diacetic acid, while the Ehrlich diazo reaction is used to demonstrate an unknown substance. In the former the colors vary a great deal—purple, violet, blue, etc.—with a foam which is not characteristic. Grape-sugar gives a beautiful fuchsin pink color with an intensely red foam. The distinction, however, between the reaction and the Ehrlich reaction is that a fixed alkali is required in the grape-sugar test, as it does not occur with ammonia.

It is the experience of every trained observer in a long series of diazo tests with a great variety of diseases that countless varieties of colors and tints have been obtained in the rings and the foams. By the inexperienced many of these would have been called diazo tests. These colors are yellow, brown, orange, and salmon, and mixtures of the same. At times even the characteristic red ring is obtained, but on shaking the essential characteristic pink foam is absent. Urea, uric acid, kreatin, xanthin, sarcin, oxalic acid, hippuric acid, allantoin, and urine rich in urobilin and indican do not give the Ehrlich diazo reaction. Normal urine does not contain diazotizable substances. In 1884, Ehrlich's work was confirmed in a series of experiments by Lenhartz, of Leyden's clinic. Fisher, Brecht, Löwinson, Cnopf and Grundies, Escherich, See, Dohrendorff, Goldschmidt, Loewe, Georgiewski, Brewing, Roessingh, Piering, Rütimeyer, Simon, Gerhardt, von Norden, all made important contributions confirming the value of this reaction both as a diagnostic and a prognostic agent in typhoid fever, and especially in tuberculosis. Fisher found the reaction constantly in measles and rarely in pneumonia. Brecht states that if the reaction appears in pneumonia it is to be regarded as of grave significance. Goldschmidt found the reaction constantly in miliary tuberculosis and typhoid fever. Brewing found this reaction of great value as a diagnostic and prognostic agent in puerperal fever and concealed septic processes, as well as in typhoid fever and tuberculosis. In surgical tuberculous affections Pape found that after every operation the reaction which had been previously present disappeared, usually within three to five days. Warthin and Simon both emphasized the importance of the color of the foam in making the test, and found it of great value in the diagnosis of typhoid fever and the prognosis of tuberculosis. Kessel considers the reaction of great aid in diagnosing typhoid fever in children. Michaelis especially emphasized the value of the test in the prognosis of tuberculosis. He also found this reaction to be very constant in measles and strikingly infrequent in German measles.

Notwithstanding the fact that a great mass of convincing evidence has been collected during the past seventeen years as to the value of the Ehrlich diazo reaction, especially as to the diagnosis of typhoid fever and the prognosis of tuberculosis, it is remarkable that the great majority of practising physicians in this country are not familiar with the reaction, and never make use of it in diagnosis or prognosis of disease.

The Ehrlich diazo reaction, like so many of our useful clinical tests —the tests for indican, bile, sugar, hydrochloric acid, lactic acid—is a color reaction, and depends upon the production of dyes by the chemical union of suitable organic substances with a diazo compound.

In carrying out this test the reagent is prepared according to the formulæ recommended by Ehrlich. We require two solutions, which are termed respectively solutions I. and II.

	Reagent.	
Solution I.	Sulphanilic acid,	1
	Hydrochloric acid,	50
	Distilled water,	ad. 1000
Solution II.	Sodium nitrite,	0.5
	Distilled water,	ad. 100

To fifty parts of solution I. add one part of solution II. and shake. To a few c.c of this mixture, and an equal quantity of urine, add a quantity of ammonia equal to about one-eighth of the combined volume of the mixed urine and solution, letting it run down the side of the test tube.

At the point of contact of the ammonia and the mixture, colored rings of various tints form, ranging from light yellow, through dark yellow, orange, and brown, to eosin or garnet, depending upon the urine. The formation of a red zone is an indispensable part of the true Ehrlich diazo reaction. It is also essential that, on shaking, the foam take on a pink color. This color varies considerably in its intensity, depending upon the strength of the reaction, from the palest rose to the deepest pink, but must not be any other color, such as salmon, orange, etc.

A third part of the reaction which Ehrlich considered important, consists in the separation of a greenish-black or violet-black precipitate, which forms a layer on the surface of the light-colored sediment when the tube has been allowed to stand for twenty-four hours. The changes which take place in this reaction may be represented graphically as follows:

$$(1)\qquad NaNo_2 + Hcl = HNO_2 + NaCl.$$

$$(2)\qquad \overset{\text{Sulphanilic acid.}}{C_6H_4NH_2HSO_3} + HNO_2 = \overset{\text{Diazobenzolsulphonic acid.}}{C_6H_5N_2HSO_4} + HO.$$

The resulting fluid contains small quantities of diazobenzolsulphonic acid, to which the reaction is due, together with some excess of sulphanilic and hydrochloric acids which are indifferent or beneficial. The diazobenzolsulphonic acid unites with certain aromatic bodies in the urine to form aniline dyes. The solutions should be kept in dark bottles. If the mixture of solutions I. and II. is not used immediately it should be placed in a dark bottle and kept as cool as possible. In summer it can be used for one to two days, and in winter three to five days. The urine likewise should be as fresh as possible. The proportions of the mixtures have been varied by certain authors. Greene used 1 part of solution II. to 100 parts of solution I., and says that with this dilute mixture the orange and mixed reds and yellows mostly disappeared. According to his experience pulmonary tuberculosis and pneumonia fail to give the reaction with this high dilution, while they do with 1 to 40. The reaction still remained distinct and perfectly defined in septicæmia, typhoid fever, and advanced malignant disease.

Ehrlich has suggested a new method of performing the test, in which he mixes one volume of urine with from five to six volumes of absolute alcohol, filters, then adds the sulphanilic acid mixture to the filtrate. My series of tests have all been performed according to the first method, which is more convenient, less expensive, and sufficiently delicate.

The cause of this reaction is not known. It has been attributed to diacetic acid (Munson and Oertel) and to acetone (Von Jaksch). Warthin and Spiethoff proved conclusively that diacetic acid does not give the diazo reaction where ½ per cent. sodium nitrite solution is used.

In my series of cases there were fourteen of diabetes mellitus, eight of which gave good tests for acetone, and although numerous diazo tests were made according to Ehrlich's method the reaction was never found.

All authorities agree that this reaction is not dependent upon fever. In some of our cases of tuberculosis and carcinoma with subnormal temperature a strong reaction was found. However, most of the cases of tuberculosis have an intermittent fever when the reaction is present. In the cases of typhoid fever the reaction never continued after the decline of temperature to normal. That the reaction is dependent on substances excreted during the course of certain diseases, and not upon the height of the temperature, is well illustrated by most of the cases of croupous pneumonia in which temperatures of 104° and 105° are very rarely accompanied by the diazo reaction; also by the fact that Gerhardt found the diazo reaction in half of his cases of afebrile typhoid. In nearly all cases there is evidence of a marked intoxication of some sort bordering on the typhoid state. There are some things which we know about this substance. It is soluble in water and alcohol, insoluble in ether, chloroform, benzol, xylol and carbon disulphide. Neither sugar of lead, silver nitrate, nor platinic chloride precipitate the substance from urine. Liquor plumbi subacetatis and milk of lime precipitate most of it. It exerts no reducing action on alkaline copper sulphate solution. In making the test it is best that the urine be as fresh as possible. However, urine which has been evaporated to a syrupy consistency will retain the capacity to give this reaction indefinitely (Michaelis). After nine months, when dissolved in an equal quantity of water, it gave the reaction very well (Clemens). In polyuria the reaction may disappear, but on concentration of the urine the test becomes positive. Various materials, such as bilirubin, urobilin, and carbol, interfere with the reaction somewhat, but can be removed by sugar of lead or animal charcoal. Burghart states that when preparations of tannic or gallic acid, or tincture of iodine (not the salts of iodine), are taken internally they prevent this reaction in patients who have previously shown for some time good diazo tests. This statement, if confirmed, is a very important one, as these preparations are often given in two of our most important diazo diseases—tuberculosis and typhoid fever. The author believes that these substances attack the diazo reagents and thus prevent the reaction. I am unable to refute or confirm these statements. Clemens declares that in the test-tube tannic acid precipitated or destroyed the substance, which was not recovered by the use of hydrochloric acid.

In this article I shall record the results of a critical analysis of the diazo tests made in the clinic of Dr. George Dock during the past six years. It is a sequel to the report of Dr. Warthin published in 1893. The method of performing the test has been the same as that used by him, and is practically the same as that recommended by Ehrlich, except that forty parts of solution I. are used instead of fifty, and no attention has been paid to the green precipitates. The crucial point in our tests has always been the production of a pink foam after the characteristic red ring. During this period a diazo test, with objective records of the results, has been made on practically all of the in-patients in the medical clinic, on some of them many times, and on a portion of the out-patients. The number of cases examined approaches eight hundred, while the number of tests made runs up into the thousands.

A large number of chronic and a limited number of acute diseases have been examined for this reaction. The method which I have followed in this investigation has been to note every positive diazo reaction found in the urine records during this period, and the dates of tests. The clinical records of these patients were then examined, the diagnosis of the disease found, and the severity and progress of the case considered. All other cases with similar diagnoses were investigated as to diazo. I also attempted to follow up the diazo tests in each case, in order to find out the duration of the reaction in the various diseases and also its prognostic worth and its value in indicating complications and relapses and its association with fever. Only in the cases of typhoid fever and some of the cases of tuberculosis was this done to any satisfaction, since in many out-patients only one test was made; in others only a few; while in others the tests were days apart.

Diseases.	Diazo present.	Diazo absent.	Total.
Abdominal tumor	2	5	7
Amyloid disease	2	1	3
Bronchitis, chronic	1	10	11
Carcinoma	5	28	33
Diabetes	0	14	14
Erysipelas	0	1	1
Gastritis, chronic	1	157	158
German measles	0	2	2
Heart disease	2	22	24
Leukæmia	1	12	13
Malaria	1	1	2
Measles	0	2	2
Pneumothorax and empyema	2	6	8
Pneumonia (also tuberculosis)[1]	1	6	7
Rheumatism, acute (also heart disease)[1]	1	5	6
Rheumatism, chronic	1	9	10
Typhoid fever	19	3	22
Tuberculosis	42	40	82
	81	324	405

In the accompanying table the diazo-reaction is practically limited to one acute and one chronic disease—typhoid fever and tuberculosis.

In all of the cases of typhoid fever the diazo tests were made almost daily from admission to the hospital till recovery. Unfortunately, as nearly always happens, it was impossible to follow the cases from the beginning, since some of them did not enter the hospital till the second or even the third week of the disease. Two of the three cases of typhoid fever in which diazo was negative entered the hospital in the second or third week of the disease, and had very light attacks. The Widal test was not made in either case. It is quite possible that the diazo was present and disappeared before entering the hospital. The third case gave a positive Widal reaction, but was an unusually mild attack. With the exception of the case just mentioned, all of our cases of undoubted typhoid fever that entered the hospital sufficiently early gave the diazo reaction.

In this series of cases the following sequels were met with: Phlebitis, two; abscess, three; pneumonia, one; hemorrhage from bowel, one. None of these sequels were heralded or accompanied by a diazo reaction. In two cases there were relapses with a reappearance of the diazo.

---

[1] ("Also tuberculosis") refers only to the case in which diazo was present; the same is true of ("also of heart disease").

The reappearance of the diazo points more to a relapse than the occurrence of a complication, according to the findings in our series of cases. Rütimeyer states that in relapses we almost always get a renewed reaction if the reaction has disappeared before the relapses occur. Michaelis affirms that the reappearance of the diazo reaction allows us to make a certain differential diagnosis between a recurrence and a secondary fever brought about by other causes.

The question often arises, Does the intensity or duration of the reaction correspond with the severity or length of the fever? We answer in the affirmative as to the duration of the reaction. If a patient with the clinical symptoms of typhoid fever comes under our observation toward the end of the second week of the disease and diazo is absent, the chances are that the infection is on the decline and we prognose a mild course. If, on the other hand, the diazo continues and increases in intensity, the case is liable to be prolonged and more serious. In our series of cases the diazo continued longest in the patients who were sick longest and whose symptoms were most pronounced. According to Ehrlich, the reaction first appears between the second and sixth days, and disappears usually during the first days of remission. In a case of typhoid fever which Dr. Dock was able to follow from the first day of the disease the diazo reaction was present for the first time on the fifth day. In one of our cases it was also present as early as the fifth day.

To illustrate the constancy with which this reaction is present in typhoid fever I will give the statistics of different investigators. In my series it was present in 19 out of 22 cases. Hewetson found it in 136 of 196 cases examined in Osler's clinic. The combined cases of Ehrlich, Spiethoff, Brecht, Brewing, Paterson, Jez, and Nissen number 178, of which 174 gave the reaction. Rivier has collected 536, of which 520 gave the reaction. Gerhardt says that in his clinic during a period of five years only one *bona fide* case of typhoid fever, which was proved by post-mortem, failed to give the diazo reaction. Zinn found the reaction in 75 per cent. of cases. Clemens found it in 135 of 156 cases. Greene obtained a positive result in 28 of 29 cases. Friedenwald found it in 20 of 21 cases. Dawson found it in 44 of 85 cases.

Out of a total of 82 of our cases of tuberculosis the diazo reaction was found in 42. The number of tests made in each case varied a great deal, inasmuch as a large number of the patients remained in the hospital but a few days. Had they remained longer it is quite possible that in many cases reported as negative the reaction would have been found. In some of the positive cases there were intervals of considerable length during which diazo was absent. The test was almost never found in patients with slight lesions and slow course, but nearly always in those with advanced lesions and rapid course.

In several cases of the acute forms of the disease the presence of the reaction was responsible for a grave prognosis, notwithstanding the fact that the signs were very meagre and symptoms were practically absent. A striking illustration of this fact was the case of Mr. S., who came to the hospital with the diagnosis of dyspepsia. He had neither cough nor expectoration, but had a slight evening rise of temperature, with loss of weight and strength. On physical examination there were slight signs of infiltration of the right apex. The urine showed a good diazo. Dr. Dock, who had not examined the patient, but had seen him and noted his cachectic appearance, immediately predicted tuberculosis with a bad prognosis. Ammonium chloride and iodide of potassium were given to produce expectoration, and eleven days after admission tubercle bacilli were found in the sputum and several days later in the stools. The patient failed very rapidly, developed a severe diarrhœa, and remained in a typhoid state till death, which occurred six weeks after admission to the hospital. Daily diazo tests were made from the day of admission till death, and, with the exception of five tests, were all positive, though varying somewhat in intensity.

In cases of pulmonary tuberculosis in which the diazo reaction is found continuously for some days, I believe, with Michaelis, that a grave prognosis should be made. This fact is of decided practical interest and should influence us in advising patients about change of climate. The amount of needless suffering which is caused, the waste of large sums of money uselessly by poor people, the harm done the climatic treatment of consumption by sending hopeless cases to our Western resorts to die is something criminal. It is by no means an easy matter to give advice in these cases. Many physicians are not thoroughly familiar with the physical signs of this disease and know not what conclusions to draw from their examinations. All cases of tuberculosis giving the diazo reaction continuously for some days may be considered in the third stage of the disease. Such cases will not be permanently benefited by change of climate.

On an average between 20 and 30 per cent. of consumptives give the reaction (Clemens). The prognostic value of the reaction in this disease can be gathered from the fact that in 100 of Clemens' fatal cases 87 of them gave this test. Michaelis states that the great majority of consumptives who show a marked diazo for several days die within half a year. In 88 cases, which he has collected since 1896, 63 gave a positive, 25 a negative reaction. Of the 63 diazo cases, 50 died in the hospital, 5 left unimproved, 2 were transferred, and 6 improved. Of the 25 cases without diazo, 20 improved, 1 left cured, 2 died, and 2 did not improve.

The absence of the reaction in one of my cases of tuberculous meningitis and miliary tuberculosis should be emphasized because of the assistance it would render in making an early differential diagnosis between these diseases and typhoid fever, were it always absent in the former. Anyone with a large experience will admit that even a master medical mind stands in doubt in many cases in differentiating between typhoid fever so protean in character, with such variable temperature-curves, and tuberculous meningitis and miliary tuberculosis. In the above case it was impossible to make a diagnosis till the development of the brain symptoms. I made a Widal test, and with a dilution of 1 to 10 there was characteristic clumping, while with 1 to 30 the agglutination was not typical. Daily diazo tests were made, but the reaction was never found—a fact which had weight in eliminating typhoid fever. Postmortem proved it to be a case of tuberculous meningitis and miliary tuberculosis. Simon says in his *Clinical Diagnosis:* "Since the reaction is obtained not later than the twenty-second day of the disease, and is usually present as early as the fifth or sixth day in typhoid fever, and while it generally does not appear earlier than the beginning of the third week, and then persists almost to the end in acute tuberculosis, its occurrence may be of decided value in diagnosis in many instances."

Three of the cases of tuberculosis in which the diazo was negative were cases of peritoneal tuberculosis. One of the cases in which it was negative was tuberculous meningitis and miliary tuberculosis. In one case of peritoneal tuberculosis the diazo was positive. In one case in which there were both pulmonary and peritoneal tuberculosis the diazo reaction was positive.

The differential diagnosis between cirrhosis of the liver and tuberculosis of the peritoneum is often difficult. The presence of this reaction favors tuberculosis, but does not assist in excluding cancer or sarcoma of the peritoneum.

In measles statistics show the reaction to be very constant. Combining the statistics of Brewing, Brecht, Fischer, Nissen, Rivier, and Clemens we have ninety-eight cases in which there were only twelve negative. Michaelis uses this reaction as a means of differential diagnosis between measles and German measles, it being absent constantly in the latter. The reaction lasts about five days. In two of my cases of measles and several cases of German measles the reaction was absent.

Typhus Fever. Fischer found it in three cases; Dawson in five out of ten cases.

Scarlet Fever. Of eighty-seven cases from Brewing, Nissen, and Clemens thirty gave the reaction. In three typical cases of moderate severity I never found diazo.

In thirty-three of our cases of carcinoma it was present in five. Michaelis believes that in these cases it is due to a secondary infection, as, for instance, an ulcerating carcinoma and similar processes with bacterial infection.

Erysipelas. In a case with very extensive lesions originating at the site of drainage wounds and extending over almost the entire body, I was never able to find diazo. Clemens reports five positive cases in one hundred and twenty-two. Coste found the reaction in two-thirds of his cases.

The results of my observations have been to confirm in most particulars the statements of Ehrlich. They also agree with results published from this laboratory in 1893 by Dr. Warthin. The fact that during the past eight years the test has been made in the same way in the clinical laboratory makes our results most trustworthy.

In deciding upon the clinical value of the Ehrlich diazo reaction we can fairly discard the work of all investigators who have not performed the test in accordance with the directions laid down by Ehrlich, or who have not considered the pink foam as the important factor in the test. In this list are included the names of Penzoldt, Petri, von Jaksch, Munson and Oertel, and Edwards. The statistics presented by numerous investigators who have performed the test correctly are overwhelmingly convincing as to the value of this reaction in the diagnosis and prognosis of typhoid fever, and the prognosis of disease such as pneumonia, diphtheria, septicæmia, and especially tuberculosis.

A CASE OF TRICUSPID AND MITRAL STENOSIS WITH ADHERENT PERICARDIUM.

By T. L. Chadbourne, M.D.,
of Gallipolis, Ohio.

(*From the Pathological Laboratory of the Ohio Hospital for Epileptics.*)

Uncomplicated tricuspid stenosis is rare; it usually occurs in combination with lesions of one or more of the other cardiac orifices, most commonly the mitral. In 114 cases collected and analyzed by Leudet, simple tricuspid stenosis was present in 11; and it was met with in 1 of the 14 new cases described by Ashton and Stewart in their résumé. In point of frequency, after combined tricuspid and mitral stenosis, comes the association of tricuspid, mitral, and aortic stenosis. Articular rheumatism is the most common clinical antecedent in this class of cases, and considering the frequency with which this disease is accompanied by both endocardial and pericardial inflammation, it seems strange that the association of an obliterative pericarditis with the valvular changes does not appear more frequently than the available records show. In 86 cases of tricuspid stenosis briefly noted by Steele, the pericardium was recorded as adherent in 7; and in the 12 original examples with autopsy, making the basis for his work on *Adherent*

Pericardium, Broadbent found tricuspid stenosis but once. Besides these more exhaustive summaries, isolated cases of simple or combined tricuspid stenosis have been since contributed by Dock, Kassem-Beck, Steele, McCarty, Packard and others. In one of his two cases Kassem-Beck found adherent pericardium.

The case now to be described in its main points as to sex, rheumatic history, and limitation of the lesion to the auriculo-ventricular orifices conforms to the more general rule, but the addition of the ancient obliterative pericarditis serves to give it a certain distinction among a class of cases of comparatively infrequent description, especially where the clinical observations are supplemented by deliberate post-mortem examination.

Clinical History. S. A., female, white, native of Ohio, was admitted to the Ohio Hospital for Epileptics, August 20, 1894, when thirty-six years of age. At that time the following facts were recorded: The father is dead; there are several brothers, of whom one is said to be an epileptic. Previous to the first epileptic seizure this patient had typhoid fever and inflammatory rheumatism of the lower extremities, and to the latter affection she ascribes the onset of her epilepsy. Since the first attack, five years ago, in the thirty-first year of her age, the epileptic paroxysms have occurred at irregular intervals, averaging about one a month, and from her description seem to have been severe.

As to the epilepsy, it may be well to here add that the patient's attacks, as witnessed since her admission to the hospital, resemble those of idiopathic *grand mal;* though the late onset of the disease, and the unsatisfactory details regarding the seizures, together with the post-mortem findings of chronic heart disease, tend to raise a doubt as to the nature of the epilepsy, which possibly belongs to the type of convulsions known as "cardiac epilepsy" rather than those of idiopathic *grand mal.*

The patient was a large woman, five feet seven inches in height, weighing one hundred and fifty-two and one-half pounds, and in an excellent state of nutrition. At this entrance-examination the lungs were negative; respirations 28; liver dulness normal; heart dulness enlarged to the left, with a blowing murmur at the apex.

During the five years of residence at this hospital the patient was never sick in bed, and attended to such work as her simple mental condition allowed. She had occasional attacks of incompensation, at which times she had œdema and complained of shortness of breath, but usually recovered in a few days.

On April 15, 1899, she took to bed with the fatal illness. I saw her twice during this period with Dr. W. G. List, in whose service she was. The following notes were made: The patient lies propped up in bed, dyspnœic, moderately cyanotic, with cough and bloody expectoration and marked tense œdema of the feet and slight puffiness of the face. The skin is generally sallow, there is a thick panniculus. A slight enlargement of the thyroid gland can be detected. The chest is large and well formed. The apex-beat is not to be seen or felt; there is well-marked heart shock, but no thrill can be felt. The dulness is somewhat enlarged to the left; the lower sternum is quite dull, and the dulness extends high up along the left border of the sternum. On auscultation in the apex region the first sound is extremely loud and sharp. There is a loud, harsh murmur, beginning with the first sound, suddenly becoming quite soft and of different character, and fading away some time before the loud first sound again recurs. The second sound is not heard at the apex. Both sounds are heard at the base, the first pulmonary is louder than the second, and is accompanied by a blowing murmur. The pulse is full, but soft and quite regular. There is moderate dulness with small moist râles and blowing breathing low down in the back. The abdomen is level with the ribs; there are no signs of fluid in it, and neither the spleen nor the liver can be felt, although there is tenderness in the region of the latter organ.

The urine is brownish; specific gravity 1040, and it solidifies upon the addition of nitric acid after boiling. The sediment is copious and made up of large and small casts of all descriptions—hyaline, hyaline with granules; many bearing leucocytes and epithelial cells and occasionally red-blood cells; there are also free leucocytes, epithelial and blood cells in the urine.

The probability of there being a double mitral lesion was entertained from the first, but the true state of the case was not discovered till the post-mortem examination, as the following data, taken in most part from Dr. Ohlmacher's notes, will show.

Pathological Résumé. The necropsy was held May 2, 1898, eight hours post-mortem. The body is that of a large, well-nourished woman, of middle age, 172 cm. long. There is pronounced rigor mortis. Slight œdema of ankles is evident. Frothy, blood-stained fluid is issuing from the nose and mouth. The mucous membranes of the mouth, nose, and eyes are purplish; the ears, too, are cyanotic. The pupils are dilated and equal. The face and neck are mottled and livid; and there is marked lividity on the back. There is a moderately thick fat layer.

The abdomen is somewhat distended, and contains about 100 c.cm. of clear fluid; the intestines and stomach are moderately inflated with gas. Both are negative except that in the lower ileum the patches of Peyer have the shaven-beard appearance.

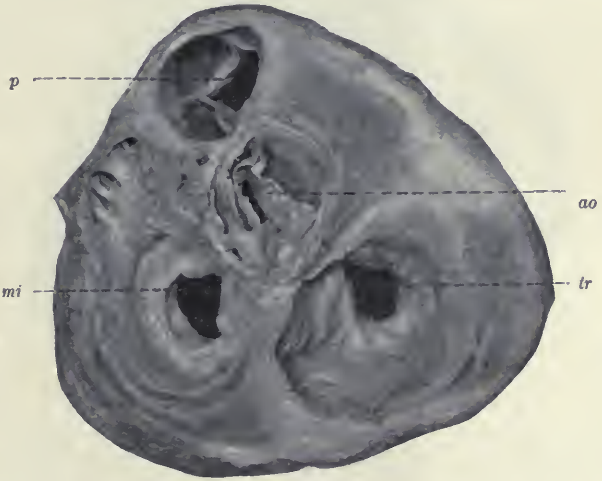
The liver adheres to the diaphragm; it weighs 1910 grammes. On section a moderate interstitial hepatitis is revealed; the lobules all standing out with undue prominence. Microscopically, the connective tissue is a good deal increased, mostly about the lobules, though occasional bands cut through them; the capillaries are congested, and there is atrophy of many of the hepatic cells, with occasional slight fatty degeneration.

The spleen weighs 360 grammes. It is quite firm, with its follicles plainly visible in the light purple pulp. Under the microscope a congestion of limited degree and a thickening of the trabeculæ are seen.

The kidneys together weigh 290 grammes, and present a roughened surface. The capsules adhere, and when pulled off leave a universally broken surface, with reddish depressions and raised yellowish foci. The cortex is narrowed about one-half and is mottled yellowish red. Histological sections show the general but irregularly disposed increase of connective tissue of secondary contracted kidney, together with congestion, and cloudy swelling of the parenchyma. The suprarenal bodies appear normal.

There is a bilateral almost complete obliterating pleuritis, with about 500 c.c. of clear fluid in each side. In both lungs the lower lobes are pneumonic, being flesh-like, solid, and sinking in water, with little fluid escaping on section; abundant frothy, blood-stained fluid issues from the cut surfaces of the upper lobes, and similar fluid flows from the mouth as the lungs are squeezed. There is moderate œdema of the glottis. There are calcareous foci in the upper lobe of the left lung. The right lung weighs 860 and the left 850 grammes. The bronchial glands are large, and some of them contain caseous foci. The thyroid is about one-third larger than the ordinary adult organ. A number of small cysts containing a gelatinous, dark-brown material are scattered throughout its substance, and along with this general cystic metamorphosis, which shows the histological characteristics of the colloid-cystic struma, each lobe contains a more dense, spherical, encapsulated nodule, about 1 cm. in diameter, also containing small cysts, and exhibiting the microscopical structure of a cystic adenoma. The thymus is represented by a bilobed thymic fat body which has apparently undergone complete fatty metamorphosis.

FIG. 1

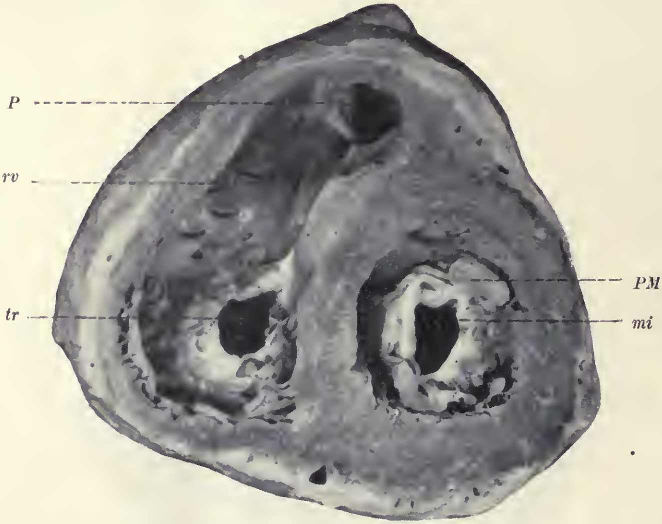


A cross-section of the hardened heart just above the valvular plane, showing the four valvular orifices from the cephalic aspect. The thin and free segments of the aortic (*ao*) and of the pulmonary (*p*) valves and of the coalesced tricuspid (*tr*) and mitral (*mi*) are evident. An inadvertent incision has slightly disturbed the relations of the aortic segments.

There is complete obliterating chronic pericarditis without, however, much pericardial thickening. The heart, which is extremely flabby, weighs with its adherent pericardium 500 grammes. There are a few minute atheromatous spots in the aorta. The coronary arteries are slightly atheromatous, but, so far as examined, not obliterated. In the examination of the whole fresh organ it was discovered by palpation that both the mitral and tricuspid orifices were so narrow as to admit only the tip of the index finger, the edges being thickened, rigid, and almost cartilaginous in consistency; but the aortic valves, while somewhat thickened, were movable, and proved competent by the hydrostatic test, and the pulmonary valves were quite unaltered.

The heart was hardened whole in formalin without further dissection. The whole hardened heart, which has preserved its original shape remarkably well, measures 14 cm. in length, 9 to 10.5 cm. in width, and 30.5 cm. in circumference. On cutting, all the chambers were much distended, without much hypertrophy of the ventricular walls. The wall of the left ventricle varies in thickness from 14 to 17 mm., and that of the right from 5 to 8 mm. The pulmonary valves are not thickened. The aortic valves are slightly thickened. There is well-marked stenosis of both the mitral and tricuspid valves, that of the mitral being a little more pronounced. Both project as rigid cones into the ventricles. The mitral opening is irregularly triangular in shape, 17 mm. in its greatest length and 13 in its greatest width. The tricuspid orifice is roughly pyriform, 16 x 10 mm. The appearance of the narrowed orifices, seen both from above and below, is shown in Figs. 1 and 2. The papillary muscle, on macroscopic section, shows the usual whitish, irregular scars of fibrous myocarditis. This is confirmed by the microscopical examination, which also discovers a marked degree of fragmentation of the muscle-fibres.

FIG. 2.



A trans-section of the same specimen immediately below the valvular plane, showing the stenotic orifices (lettered as in Fig. 1) and surrounding parts from the caudal aspect. The thickened, white, unbroken rings bounding the narrowed orifices make conical projections into the ventricular cavities. The pulmonary sinus is located at *P*, and the dome of the dilated right ventricle is marked by *r v*; *P M* shows the thickened left papillary muscle.

A CRITICAL SUMMARY OF THE LITERATURE

ON

RETROPERITONEAL SARCOMA.[1]

By J. Dutton Steele, M.D.,
INSTRUCTOR IN CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA.

The credit of the name "retroperitoneal sarcoma" belongs to Lobstein, and his description of the condition in his *Traité d'Anatomie Pathologique*, 1829, tome i. p. 446, is so accurate that one can add little to it in regard to the gross appearance of the condition. He adds to his notes upon the macroscopical description that these growths often spring from behind the mesentery, from the connective tissue sheath of the great vessels or the fibrous tissue about the spine, but particularly from the retroperitoneal lymph glands. He adds that the tumors are sometimes cheesy, sometimes bacony, and very often hemorrhagic. A decided capsule is usually wanting. The growth of the tumor is quick and produces functional changes in the organs pressed upon, and often causes neuralgic pains from pressure upon the nerves.

After Lobstein, the next important observation upon the occurrence of retroperitoneal sarcoma was made by Virchow in his work, *Die Geschwülste*, 1864, vol. i. p. 383. He says: "Many of the retroperitoneal tumors, known since Lobstein, are pure medullary spindle-celled sarcomata. One may doubt whether they take their origin from the fatty tissue; indeed, it is probable from their structure that they spring from the connective tissue, especially the fascias. Retroperitoneal sarcomata are, as a rule, solitary and slow of growth, but they may reach comparatively large size. The growth is influenced by surrounding pressure, and their symptoms naturally differ according to their origin. In the pelvis they first press upon the nerves, and the earlier symptoms are neuralgic pains or paralysis. In the iliac fossa the pressure is exerted upon the vessels, and the symptoms may be those of one-sided œdema or phlegmasia alba dolens. When they are higher in situation they become attached to the small gut, and they can grow so much as to entirely compress it and cause stenosis with all its symptoms."

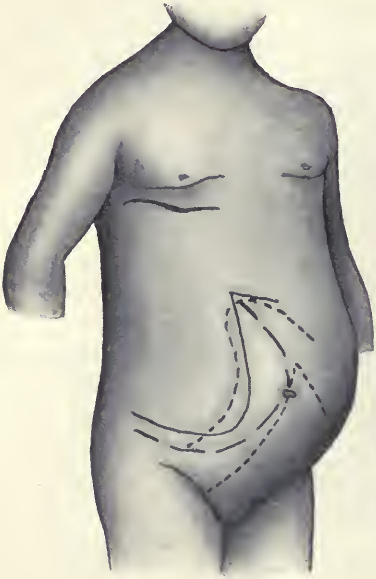
The first tabulation of cases was in the article of Keresztszeghy, published in 1893. He collected nineteen cases and added two of his own. One of Keresztszeghy's cases was a lipomyxosarcoma, and as such is not included in my list, as is explained hereafter. Waldeyer's case, included in Keresztszeghy's list, is also an instance of a sarcomatous change in a retroperitoneal lipoma. When these two are sub-tracted the number of true retroperitoneal sarcomata reported in his article amounted to nineteen.

---

[1] Read before the College of Physicians, Philadelphia, February 7, 1900.

Witzel, in 1886, contributed his paper, which is considered in detail hereafter. He reports three cases, and his contributions to the diagnosis and pathology of the affection are among the most valuable found in the publications upon the subject. The condition has been considered in short articles by Lockwood, Anderson, Vander Veer, Lizzato, and in the admirable section of Allbutt's *System of Medicine*, written by Dr. Allbutt himself. With this exception most of the references to retroperitoneal sarcoma have been reports of isolated cases or short mention of the subject in the leading surgical text-books. The literature of internal medicine proper has been strangely silent upon the subject. Almost all the authorities consulted pass the subject by without what would seem to be due consideration.

FIG. 1.



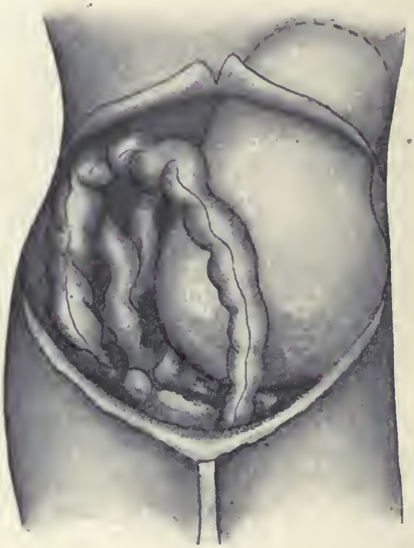
(After WITZEL.)

— —— Palpable edge of tumor.

- - - - - - - Colon.

———— Limit of dulness.

FIG. 2.



(After WITZEL.)

After a somewhat exhaustive search sixty-one cases of retroperitoneal sarcomata have been collected.[1] The comparative rarity of the condition is demonstrated by the fact that in 14,630 tumors collected by

---

[1] The writer reported a case of endothelioma of the retroperitoneal space, before the Pathological Society of Philadelphia, in November, 1899. As far as can be ascertained it is the only instance of retroperitoneal endothelioma on record. It is included in the list of cases.

Gurlt in the Allgemeines Krankenhaus in Vienna, of which 894 were sarcomata, there was but one sarcoma of the retroperitoneal space. This, however, would seem too small a proportion to be a fair one. In the record of the Philadelphia Pathological Society, covering fifty-two years, there are six cases reported, including that of Dr. Willard and myself.

As has been inferred, the use of the name "retroperitoneal sarcoma," while properly applying to all growths in any structure lying behind the peritoneum since Lobstein, has been restricted to sarcomata arising behind the peritoneum, and not connected with any of the great organs in that region. This, of course, excludes those of the kidney and suprarenal capsules. Chiari's paper upon the existence of accessory suprarenal capsules in man demonstrates the fact that retroperitoneal tumors may spring from supernumerary suprarenal capsules lying in the retroperitoneal space.

Again, while tumors of the omentum and of the mesenteric glands would anatomically come under such a classification, these growths differ clinically from the so-called retroperitoneal sarcoma, and were not included among my cases. Dr. Adami, in his classical paper, "Retroperitoneal and Perirenal Lipoma," calls attention to another form of sarcomatous growths. This is a lipoma or myxolipoma that has undergone sarcomatous degeneration. He cites two cases—one of Hanna's and the one reported by Waldeyer—to which I have been able to add two cases reported by Vander Veer.

These growths are so nearly identical with the retroperitoneal lipomata in their clinical and pathological characteristics that they have not been classified in my list. Microscopically, fatty and myxomatous tissue predominates, and Adami's theory of their pathology appears to be the correct one, namely, that the sarcomatous development has been engrafted upon a previously existing pure lipoma or one with extensive myxomatous degeneration.

Again, only cases that are primary have been considered. There may be, of course, secondary sarcomata in the retroperitoneal glands as in other lymph glands of the body. In such cases the primary seat is usually in the testis or ovary.

AGE. The age at which the growth appears is shown by the appended table. It will be seen that the condition is most frequent in the first, fourth, and sixth decades—that is to say, with the exception of the cases occurring in children, rather later than sarcoma usually presents itself. The first five years of life are quite prone to the affection, and five cases occurred in the fourth and fifth year. The years from ten to twenty-five almost entirely escape. The oldest case was a man of seventy-eight years, reported by Ellis; the youngest, under a year of age, reported by C. A. Martin. My case of endothelioma occurred in a girl four years of age:

0 to 10 years	10	41 to 50 years	10
11 " 20 "	0	51 " 60 "	15
21 " 30 "	7	61 " 70 "	2
31 " 40 "	9	71 " 80 "	3

Sex. Males are more frequently affected than females, though the difference is not great. In the list there were thirty-five males against twenty-three females, and in five cases the sex was not recorded.

Position. The portion of the abdomen from which the neoplasm originated is generally exceedingly hard to determine, and consequently a classification of the cases in accordance with their source is one that must be liable to error. An attempt has been made to compile such a table by assuming that tumors consisting entirely of spindle cells spring from fibrous tissue, those showing both round and spindle cells in a reticulum of fibrous tissue may have had their origin in the lymph glands. But it cannot be said that this classification is one of much value. The portion of the retroperitoneal space from which the growths originated are somewhat easier to determine, but even here error may creep in.

A table of the source and point of origin of the cases as far as it has been possible to determine them is as follows :

Unrecorded	7
Retroperitoneal lymph gland of root of mesentery	8
" " " about spine	2
" " " right lumbar region	7
" " " right iliac	2
" " " left lumbar	5
" " " pelvis	2
" " " iliac region	1
" " " left lumbar and right iliac	1
Connective tissue about spine	6
" " of sheath of great vessels	3
" " of right iliac region	1
" " of left lumbar region	1
" " of left iliac region	3
" " of pelvis	1
" " about kidney	1
Endothelium of lymphatic radicals about left kidney	1
Doubtful origin—centre	2
" " right lumbar	5
" " right iliac	1
" " left lumbar	2
" " pelvis	1

It will be seen that of the forty-five cases in which it is possible to arrive at even an approximate conclusion as to the tissue from which the growths spring, twenty-eight, or 64 per cent of tumors, were in the retroperitoneal lymph glands, sixteen, or 36 per cent., from the retroperitoneal connective tissue or the sheath of the great vessels. The summary of the tumors in fifty-four cases is as follows :

Centre of the retroperitoneal space	21
Right side of " "	17
Left side of " "	11
Pelvis	4

In one case the side is not given, and one sprung from both sides. Twenty-eight, or 57 per cent., were lateral ; twenty-one, or 41 per cent., median, and four, or 2 per cent., pelvic. The right side was oftener affected than the left, a fact for which no explanation can be given. My case of endothelioma took its origin from lymphatics around the left kidney.

Shape and Size. The tumor is generally lobulated and not larger than a man's head, at least no larger one is recorded in the collected cases. In its earliest stages the growth is hard and white, and it is very prone to degeneration, which is usually hemorrhagic in character. This degenerative process often goes on to such a stage that the tumor becomes cystic, and the softening may affect it to such an extent that a fluctuation wave can be felt through the abdominal wall. The tabulated tumors are cystic in twenty-two of the cases, or 35 per cent. In fifteen of these the degeneration was a hemorrhagic one, and the centre of the softened growth was filled with dark-brown fluid or semi-fluid material that had occasionally been withdrawn by aspiration. One tumor is reported as cystic from mucoid degeneration. In addition eight tumors are reported as myxosarcomata. The microscopical examination in forty-four cases was as follows :

Small round-cell sarcoma	9
Large round-cell sarcoma	2
Spindle-cell sarcoma	12
Spindle and round sarcoma	7
Lymphosarcoma	5
Myxosarcoma	8
Endothelioma	1

In the case reported by McGraw the tumor, as in my own case of endothelioma, contained unstriped muscle fibres. This is easily explained by the fact that bands of unstriped muscle fibre traverse the retroperitoneal space, and the result of the inclusion of such bands by the sarcomatous process is bundles of typical unstriped muscle cells with rod-shaped nuclei that run here and there between the bundles of sarcoma cells.

Metastases occurred in nineteen cases, and affected the different organs as follows :

Liver	7
Lungs	6
Spleen	2
Pericardium	2
Skin of thorax	2

Pleura, kidneys, heart, bone, brain, cord, dura—one each.

The endothelioma gave metastasis to the skin of the thorax and probably to some of the viscera.

In the greater number of cases the growth spread into the neighboring structures, following the course of the lymphatic channels. It involved the intestine in a large portion, especially in the later stages.

The tumor infiltrated and perforated the rectum in two cases, the bladder and stomach in one each. In three death was caused by rupture of a degeneration cyst into the peritoneal cavity.

SYMPTOMATOLOGY. The onset of the affection is almost always insidious, and the earliest manifestations of the presence of the mass are indefinite symptoms of some interference with the function of the stomach or intestines. There may be dragging sensations in the abdomen ; disturbance of digestion ; constipation ; diarrhœa ; colicky pains or nausea, and loss of appetite.

PRESSURE SYMPTOMS. The earliest symptoms that can be considered at all characteristic are those of pressure upon the venous supply of the lower extremities or upon the nerves of the lumbar and sacral plexuses. The manifestations of such pressure are œdema or neuralgic pains in either or both legs. These symptoms are much more characteristic of solid malignant tumors than of any other retroperitoneal growth, except, perhaps, the rare form of myofibroma, examples of which have been reported by Shields and Harris. This is probably explained by the fact that such tumors are of firmer consistency and quicker growth than any other neoplasm in the retroperitoneal space. The leg pains appear to be more frequent when the tumor springs from the lumbar or sacral region. This is easily understood when the position of the lumbar and sacral nerves is considered.

The œdema, when present, begins in the feet and spreads up the legs to the external genitalia and abdominal walls. Its distribution depends upon the position of the growth. In the lateral tumors the dropsy is usually unilateral, and first appears in the lower extremities of the same side, but becomes bilateral as the increasing size of the tumor causes pressure upon the cava as well as the common iliac vein. In the median variety the œdema is commonly bilateral from the beginning. Sometimes, however, these signs of interference with circulation and the nerve supply are entirely absent, and the only subjective symptoms of the early stages before the presence of the tumor is observed are the signs of interference with the functions of the digestive tract. In such cases pain and œdema usually appear at a later stage of the development of the disease.

Ellis' patient, a boy of seven years of age, had occasional œdema of the scrotum, left lung, and left side of the face. The tumor surrounded the left kidney. It seems possible that the pressure upon the sympathetic system caused the peculiar distribution of the dropsy in this instance.

In Keresztszeghy's case the first symptom noticed was a shooting pain in the left foot, gradually spreading over the left leg. The tumor was in the left lumbar region.

Wasting and a cachectic condition, with loss of strength and appetite, begin early in some cases, and in others appear quite slowly. Some patients, indeed, retain their strength and a fair condition of nutrition for a surprisingly long period. As the tumor enlarges the original symptoms grow worse, and new ones develop depending upon the direction in which the pressure of the growth is exerted. The later ones are most varied in character. One of the most constant is neuralgic pain felt in the lumbar region, which is often very intense, and is referred to the back of the abdomen. This and the accidental discovery of the tumor are the two most frequent causes for the patients coming under observation. Another symptom is constipation, and sometimes intestinal obstruction, complete or incomplete. Indeed, in the middle and advanced stages of the growth the development or partial or complete intestinal obstruction is a most characteristic symptom, and special stress has been laid upon this fact by Lobstein, Virchow, and Witzel. It is due, of course, to pressure upon the small gut, or kinking from the traction of adhesions, and is usually a high obstruction in the small intestine. A case of Madelung's is quoted by Witzel, in which the occurrence of a high intestinal obstruction had thrown doubts upon a previously made diagnosis of tumor of the genitalia. An operation showed that the growth was a retroperitoneal sarcoma.

In two cases, reported by Virchow and Elliot, femoral phlebitis-phlegmasia alba dolens occurred. In Lurrier's interesting case blood was passed from the urethra of a child, three years old, and on one occasion a piece of tissue came away through the same channel, which was shown microscopically to be from a lymph gland. A diagnosis was made of a new growth affecting the retroperitoneal lymph glands, and the autopsy showed a lymphosarcoma that had perforated the bladder.

In Osler's case there was polyuria amounting to 9.7 pints in twenty-four hours. The urine was of low specific gravity and without sugar. He thinks that this symptom was due to pressure upon the renal nerves and solar plexus.

PHYSICAL SIGNS. In the early stages of the affection the physical examination shows little besides the existence of a tumor placed far back in the abdominal cavity. In lateral growth the diagnosis between this affection and solid tumors of the kidneys and the suprarenal capsules would be extremely difficult to make by means of physical examination alone. If the mass can be distinctly separated from the liver and spleen by zones of resonance, and is movable, it is easier to distinguish a retroperitoneal growth from tumors of these organs. It must be remembered that some sarcomata spring from the right lumbar region beneath the liver, which, by reason of their close attachment to the latter organ, often move with respiration, and are frequently taken for solid or cystic growths of the liver itself. Such cases are reported by Ransohoff and the *Middlesex Hospital Reports*, 1888, p. 275. In E. Monnier's case the mass was closely adherent to the under surface of the liver, and projected from under its edge so that it was clearly impossible to differentiate between them by palpation.

When the tumor springs from the centre of the retroperitoneal space the examination should be made, as Witzel suggests, under deep narcosis, and after a most thorough emptying of the intestinal tract. Even then the result of such a procedure will probably be uncertain, and the diagnosis must be made by the help of the symptoms caused by pressure upon the great vessels or the lumbar and sacral plexuses.

POSITION OF THE COLON AND SMALL INTESTINE. The diagnosis is easiest when the growth has reached what may be called the middle stage of its development, since then the most characteristic symptom, namely, the relation of the colon to the mass is most pronounced. Indeed, the sign of most importance in recognizing the retroperitoneal position of an abdominal growth is the arrangement of the intestine just referred to. It is caused by the displacement forward of the colon by the tumor as it grows between the leaflets of the mesocolon. It dissects apart the two layers of the peritoneum, and when it reaches the colon the latter is pushed forward so that the bowel will lie in a groove upon the anterior surface of the tumor. If the tumor is lateral in position the ascending or descending colon will generally lie upon the anterior and inner surface of the mass.

When the tumor is median, and in the upper half of the retroperitoneal space, it will push up the transverse colon in the same manner.

As has been said, the relation between the tumor and the colon, and occasionally the small intestine, is most characteristic of solid retroperitoneal tumors, but it occurs in all peritoneal growths that originate near the kidneys or in the median line near the attachment of the mesentery or mesocolon, and so is not at all peculiar to sarcoma, except that solid tumors would naturally cause displacement earlier than cystic ones. Witzel has recorded the condition in two cases of tumor of the suprarenal capsule and in one of pancreatic cyst. Shield found the transverse colon lying across the front of a myofibroma; Lockwood observed it in a case of lipoma with sarcomatous change, and Mery records a case of retroperitoneal blood cyst that carried the transverse colon forward in a similar manner.

When the tumor is lateral in position this characteristic sign appears much earlier in the course of the affection. This fact is easily explained by considering that the ascending and descending mesocolon are comparatively short and open, so that the corresponding portions of the colon are reached and pushed up so as to lie against the anterior surface of the tumor while it is still comparatively small.

As the mass enlarges, dissecting its way between the leaflets of the mesocolon, the bowel lies first on its anterior surface, and then, as the tumor grows around into the flank and increases in size, the colon comes to lie upon its inner as well as its anterior aspect. The presence of the bowel is usually manifested by a line of tympany which lies over the surface of the growth with dulness everywhere else over the tumor. Splashing can also be obtained on occasions, and the tympany naturally appears and disappears, depending upon the condition and contents of the intestine. Witzel recommends that the colon be inflated through the rectum as an aid to diagnosis. In cases of lateral tumors the small intestine is usually pushed into one corner of the abdomen, generally into the upper quadrant on the opposite side of that in which the growth originated.

In the median variety, in which the tumor springs from the centre of the retroperitoneal space, directly in front or just to one side of the spinal column, Witzel claims that the colon is not pushed up by the growing forward of the neoplasm. In such cases, according to his statement, the small intestine has a somewhat characteristic arrangement. The median tumors usually are first perceived through the anterior abdominal wall in the mesogastric region, in the neighborhood of the umbilicus, and usually a little to the right of it. They dissect apart the layers of the mesentery, and the small bowel lies around their sides, closely bound to their surface. At this stage only a small portion of the tumor lies against the anterior abdominal wall, and the area of dulness is small and is surrounded by a zone of tympany.

While we owe much to Witzel in return for his classification of the arrangement of the gut in the different forms of retroperitoneal tumors, still his statement that the transverse colon is not pushed forward by certain of the median retroperitoneal growths cannot be accepted as entirely correct. The transverse mesocolon is long, and a tumor growing from the retroperitoneal space, so as to dissect and spread apart its leaflets and carry forward the transverse colon, would have to obtain a considerable size before the bowel could be brought immediately in connection with its anterior surface. However, literature shows at least three cases of retroperitoneal growths in which the transverse colon ran across the anterior surface of a median tumor.

Shield reports a case of myofibroma which filled the abdominal cavity, although it was more pronounced toward the left flank. Upon operation he found that some coils of intestine, *including the transverse colon,* lay quite flattened in front of the tumor and adherent to its, capsule. Sir Hugh Burn, in the discussion upon C. B. Lockwood's paper before the Medical Society of London, mentioned a case in which the growth was secondary to tumor of the testicle. It occupied the upper portion of the abdomen. At the autopsy there was a mass the size of a man's head attached posteriorly to the retroperitoneal fascia, and the *transverse colon* lay in front of the mass. Repeated attempts were made to demonstrate the presence of the colon during life, but unsuccessfully. It was not inflated. H. Mery reports a case of a large retroperitoneal blood cyst which sprung from a point a little to the right of the centre of the posterior abdominal wall and occupied a good part of the right upper quadrant of the abdomen. The autopsy showed that the *dilated transverse colon ran across the tumor,* while the mesocolon furnished its anterior covering. The small intestine was pushed to one side.

Here, then, are three cases, in two of which solid retroperitoneal tumors springing from the median position, as described by Witzel, had dissected their way into the transverse mesocolon and carried the transverse colon forward so that it lay upon the tumor's anterior surface. The third case was that of a blood cyst that, while it projected decidedly to the right, still seemed to spring from the centre of the retroperitoneal space, and had carried forward the transverse colon in a similar manner. While none of these tumors can be included in the tabulated cases, still they are retroperitoneal growths, and two at least are solid tumors identical in their clinical characteristics with primary retroperitoneal sarcoma. The conclusions to be drawn appear to be that while the transverse colon, on account of the anatomical peculiarities of its mesocolon, is not carried forward upon the surface of the retroperitoneal median growths with the same constancy as the ascending and descending colons are by lateral tumors, still the existence of such a condition in three cases shows that its occurrence is possible, and preserves the analogy between the arrangement of the colon in both varieties of tumors springing from the retroperitoneal space. The arrangement of the small intestine, as described by Witzel, is probably more characteristic in median tumors. However, the discovery of the transverse colon upon the anterior surface of an abdominal growth would go far in determining its retroperitoneal origin.

MOVABILITY. The tumor is usually immovable, owing to its broad attachment. It can, however, show some movability. Reference has been made to the class of cases originating in the right lumbar region in which the mass moved with respiration, due probably most often to its attachment to the liver or gastrohepatic omentum. In addition there may be movability synchronous with respiration in growths in other positions. Stiller reports such an instance in which the tumor was situated in the upper left quadrant of the abdomen. In Witzel's case the tumor moved with deep inspiration, and sprung from around the lumbar vertebræ. R. Johnston reports a tumor that sprung from the left lumbar region, which moved with inspiration. In the case reported by S. W. Morton there were two tumors, one in the lower right quadrant and one in the splenic region, that were influenced by respiration, probably on account of adhesions between them and the abdominal wall. Osler, Knapp, and the Heidelberg *Klinische Annalen* for 1840 record tumors which sprung from the median position about the spinal column and could be moved by palpation, but were unaffected by respiration; and Pilliet and Vean record a similar case that grew from the right iliac fossa.

COURSE. The growth of the tumor is decidedly rapid. In thirty-seven cases in which the duration could be definitely determined the average length of time from the beginning of the subjective symptoms to operation or death was eight and seven-tenths months. The shortest case ran thirty-two days, in a man reported by Chassagne. McGraw reports a man who had had for five years indefinite symptoms of slowly developing tumor in the abdomen, which grew very rapidly in the six months immediately preceding death. It seems possible that the period of rapid growth in this case represents the true duration of the malignancy. The history, however, was so indefinite that it was considered best not to include it in the classification.

PHYSICAL CHARACTERISTICS OF THE TUMOR. It is usually at first firm and hard, and is very often lobulated. Fluctuation due to cystic degeneration was quite frequently observed, but every tumor that was shown to be cystic at the autopsy did not show a fluctuation-wave during life. The explanation for this discrepancy is probably that the cystic degeneration must be so far advanced as to cause a considerable thinning of the tissue surrounding the softened centre, or that the wall must be thinned sufficiently in some part of the tumor to cause the phenomenon. In sixty-one cases nine showed well-marked and one obscure fluctuation. In the child reported by Jacoby there was a thrill felt resembling an ecchinococcus cyst, leading to a diagnosis of that condition. The autopsy showed, however, that the tumor consisted of a sarcoma with many cystic areas of degeneration, and Jacoby thinks that this is perhaps the explanation of the phenomenon.

Termination. The termination of the affection is usually death from exhaustion. In Stiller's case there was profuse vomiting for twenty-four hours, followed by collapse. The autopsy showed that the growth had infiltrated and perforated the stomach. In three instances death resulted from rupture of the softened tumor into the peritoneal cavity.

Diagnosis. The diagnostic features of most value, indeed, the only ones that can be considered at all characteristic, are the arrangement of the intestine on the anterior surface of the tumor; the early interference of the circulation; neuralgic pains in the legs early in the course of the affection, and later the pain in the lumbar region; the rate of growth; and the tendency of these growths to cause obstruction of the intestine.

The retroperitoneal position of the tumor should be definitely determined by the pushing forward of the colon when this sign is present, and it seems probable that a careful examination by inflation would have revealed this symptom in many of the tabulated cases in which it was apparently not looked for. When the growth is too low in the abdomen to have any effect upon the position of the colon, the interference with the circulation is greater, and a rectal or vaginal examination will probably give data of value.

From malignant disease of the kidney the diagnosis appears to be extremely difficult. Indeed, it seems probable that it cannot be made without exploratory incision. The relations between the lumbar variety of these growths and the kidney or the suprarenal bodies are often very intimate. In almost all the lateral tumors in the list the mass was tightly adherent to the kidney or partially surrounded it. A retroperitoneal growth springing from the lower part of the abdomen, of course, could be diagnosed by its position, but in the lumbar variety and in the tumors of the kidney the situation of the growths and their character are so much alike that under most conditions the diagnosis might appear to be absolutely impossible without exploratory incision. They are both round tumors, very apt to be hard or elastic, sometimes fluctuating, depending upon their condition and the amount of degeneration. The distinguishing points would be that in the earliest stages tumors of the kidney are very apt to retain their original shape, and they can be moved back into the loin more readily than tumors of the retroperitoneal space. Again, in sarcoma of the kidney, hæmaturia occurs in a large minority of cases. However, when there is no hæmaturia the urine in renal tumors usually appears perfectly normal. Indeed, other tumors of the abdomen may cause hæmaturia besides those of the kidney.

According to Rolleston and Marks, primary malignant tumors of the suprarenal capsules present a great variety of symptoms, but the clinical aspect oftenest resembles that of renal tumors. The clinical picture of Addison's disease is usually not present, but may be imperfectly suggested. Thus in two of their series of twenty-six cases there was slight pigmentation of the skin. In Palamedissi's series of thirty-eight cases of carcinoma adrenalis there were also two cases that showed pigmentation. In both series the classical symptom of weakness and vomiting was absent. Two cases reported by Rolleston, as well as Mark's cases, showed excessive growth of hair on the face and body. Symptoms of pressure upon the lumbar plexus occurred in one case and œdema of the legs in six. It will be seen that the symptom-complex of retroperitoneal sarcomata may resemble that of tumors of the suprarenal capsules to a considerable extent, and there is no certain way of distinguishing renal, suprarenal, and lateral retroperitoneal tumors.

The distinction between retroperitoneal sarcoma and the rare retroperitoneal serous cysts may sometimes be difficult. The conclusions of Obalinski, who has made a study of such cysts, show them to be slow of growth and of tremendous size. They usually lie in the region of the kidney, and probably spring from the Wolffian and Müllerian bodies. The difference in the course, their size, and the result of puncture will be the distinguishing features.

It is perhaps unnecessary to consider aneurism of the abdominal aorta as a possible source of error. However, it is possible that such a mistake may occur, as Parker Syms reports a case of aneurism of the aorta that so closely simulated a solid tumor that an exploratory operation was undertaken.

It would be impossible apparently to distinguish between a myofibroma of the retroperitoneal space and a sarcoma, except by the rate of growth and resulting cachexia.

The diagnosis from lipòma and myxolipoma should be easy. The slow growth, greater size, marked fluctuation, and the late appearance of pressure symptoms in these tumors make the picture quite distinct from that of sarcoma. When, however, the lipoma begins to grow rapidly, after enlarging slowly for some time, a sarcomatous change should be suspected.

Tubercular enlargement of the retroperitoneal lymph glands should usually offer no difficulty in diagnosis. The history of the case, the uniform enlargement of the abdomen, with great emaciation, the common occurrence of fever, and the almost constant disturbance of the intestinal tract, and diarrhœa, will be the distinguishing features. The condition, moreover, is much more common than a malignant disease of the retroperitoneal glands. It is possible, however, that the nodular forms of tabes mesenterica, especially that which is insidious in its growth, without fever, might render the diagnosis difficult.

The fact that a mistaken diagnosis has been made in so many of the cases collected testifies to the difficulty of distinguishing this form of sarcomatous tumors from other abdominal growths. It appears to be most difficult in the latter stages, when the growth has filled the whole abdomen, and when the relations are so disturbed that it is almost impossible to determine the starting-point of the neoplasm with any degree of certainty. The condition has been mistaken for and operated upon for hydatid cyst, ovarian cyst, tumors of the liver and spleen, and with especial frequency mistaken for malignant disease of the kidney in children.

In the present age of surgery there can be no excuse for delaying the confirmation of the diagnosis by an exploratory incision when once it has been settled that the tumor is retroperitoneal in position. The patients have everything to gain and nothing to lose by such an operation. The distinction between the so-called retroperitoneal sarcoma and other retroperitoneal growths, especially those of the suprarenal capsule and kidney, while always difficult, is often impossible without opening the peritoneal cavity.

The conclusions to be drawn from the study of this series of cases may be tabulated as follows:

1. *Retroperitoneal sarcomata,* while rare, occur with sufficient frequency to warrant more attention from the stand-point of diagnosis than they have heretofore received.

2. *Etiology.* Males appear to be somewhat more predisposed to the affection than females (60 to 40 per cent.).

The condition is more common in the first, fourth, fifth, and sixth decades of life—that is, with the exception of the first decade, much later than sarcoma usually occurs. Traumatism does not seem to play much of a part in the causation of the condition, though in three cases the connection between an abdominal injury and the appearance of the tumor seems very significant.

3. *Course.* It is a very quick-growing tumor, the average duration in thirty cases being eight and seven-tenths months.

4. *Pathology.* The tumor generally originates in the lumbar region (57 per cent.). The next most frequent seat is the central portion of the posterior wall of the abdomen about the attachment of the mesentery (41 per cent.); 2 per cent. grow from the pelvis. For some unexplainable reason, in lateral tumors the right side is much more oftener affected. The tumor is usually lobulated and capsulated, and is hard and firm in its earlier stages, but is very prone to degeneration. Degenerative processes are oftenest hemorrhagic in character, but may be puriform or myxomatous. In a third of the cases the softening progressed to such a degree that the growth assumed a cystic character.

Metastasis was not common. When it occurs the liver and lungs are oftenest affected. In the majority of cases the growth involved the intestine, and the softened central area may rupture into the gastro-intestinal tract or the peritoneal cavity.

5. *Symptomatology.* The onset is insidious. The earliest manifestations of the presence of such a growth are functional disturbances in the digestive tract. The first symptoms that are at all characteristic are those of pressure upon the lumbar sacral nerves and upon the venous supply of the lower extremities, manifested by neuralgic pains or œdema of the feet and legs.

The symptoms of the latter stages are cachexia and neuralgic pains in the lumbar region, often complete or incomplete obstruction of the small intestine, and interference with the function of various organs upon which the growth presses.

6. *Physical signs* In the earlier stages the physical examination is uncertain and difficult; in the middle stages the colon is pushed up and lies upon the anterior surface of the tumor. In the lateral growths the small intestine is pushed to the opposite side of the abdomen, and lies in an irregular circle around those occupying the median position. This arrangement of the bowel is very characteristic of all retroperitoneal growths. The tumor may fluctuate and may move with respiration, or be movable by palpation.

7. *Diagnosis.* Beyond determining the retroperitoneal nature of the growth and its malignant character the diagnosis is very difficult. The pressure symptoms and evidences of intestinal obstruction are the most valuable differential points. It is often impossible to distinguish the growths of the retroperitoneal space from those of the kidney and suprarenal capsules by physical examination alone. The difficulty of diagnosis is, of course, increased in the latter stages of the disease, when the growth fills the abdominal cavity more or less entirely, when it may simulate almost any of the larger abdominal tumors.

An exploratory incision is the only sure method of determining the position and character of tumors that have been shown to be situated behind the peritoneum. Surgical interference offers the only opportunity for prolonging the patient's life.

BIBLIOGRAPHY.

Heidelberg. klinische Annalen, 1832.
Virchow. Geschwülste, 1856, p. 566.
C. A. Weber. Chirurgische Erfahrungen und Untersuchungen, 1859, p. 364.
A. B. Buchanan. Glasgow Medical Journal, 1864, p. 52.
E. Ellis. Lancet, January 20, 1866.
W. Waldeyer. Virchow's Archiv, vol. xxxii. p. 543.
Kopuscinski. Inaug. Dissertat., Berlin, 1873.
M. Pitrés. Bulletin de la Société Anatomique de Paris, 1874, p. 25
A. Jacoby. Transactions of the New York Pathological Society, 1877, p. 205.
J. B. Knapp. Ibid., 1877, p. 203.
B. Stort. Das Sarcom und seine Metastases, Berlin, 1877.

New York Medical Record, 1879, p. 348.
G. F. Elliot. Proceedings of the Pathological Society of London, 1879.
Kelsch and Wannebourge. Progrès Médicale, 1881, p. 728.
Ransohoff. Medical News, November 24, 1883.
Arnstein. Inaug. Dissertat., Berlin, 1883.
J. R. Chadwick. Boston Medical and Surgical Journal, 1884.
Phillipson. Lancet, May 23, 1885.
Chiari. Zeitschrift für Heilkunde, 1884, p. 449.
Witzel. Deutsches Archiv für klinische Chirurgie, 1886, p. 326.
A. Chassagne. Gaz. Méd. de Paris, May 8, 1886.
H. Arnott. Proceedings of the Pathological Society of London, 1886.
A. Kohler. Charité Annalen, 1887, p. 542.
Bardeleben. Charité Annalen, 1887, p. 439.
R. van Santroord. New York Medical Record, 1887.
T. A. McGraw. Detroit Medical Age, 1887.
H. Storser. Wiener medicinische Wochenschrift, 1888, 4 and 5.
Czerny. Archiv für klinische Chirurgie, 1888, p. 858.
R. Johnson. Proceedings of the Pathological Society of London, 1889.
W. Netzel. Centralblatt für Gynäkologie, vol. viii. p. 127.
E. Neuman. Archiv für Heilkunde, Bd. x. p. 421.
D. Nasse. Virchow's Archiv, vol. xciv. p. 473.
Zahn. Ibid., vol, cxv. p. 60.
Nicolaysen. Centralblatt für Chirurgie, vol. xiii. p. 496.
Stobbe. Archiv für Heilkunde, Bd. xvii. p. 466.
Middlesex Hospital Reports, 1883, p. 164; ibid., 1886, p. 104; ibid., 1888, p. 275; ibid., 1890, p. 122; ibid., 1895, p. 102; ibid., 1895, p. 110.
J. Tyson. Proceedings of the Pathological Society of Philadelphia, vol. xii. p. 253.
W. Osler. Ibid., vol xiii. p. 211.
W. E. Hughes. Ibid., vol. xvi. p. 230, and vol. ii., n. s., p. 260.
M. H. Fussell. Ibid., vol. xvii. p. 272.
J. D. Steele. Ibid., vol. iii., n. s., p. 21.
Stillers. Wiener med. Presse, 1890, 50 and 51.
S. W. Morton. University Medical Magazine, 1890, p. 713.
Vander Veer. Transactions of the American Surgical Association, 1891, p. 375.
A. Obalinsky. Gazzeta Lekarska and Centralblatt für Chirurgie, 1891, p. 49.
Keresztszeghy. Beiträge zur patholog. Anatomie und zur allgemeine Pathologie, 1893, vol. xii.
H. M. Biggs. New York Medical Record, July 29, 1893.
C. B. Lockwood. Transactions of the Medical Society of London, 1895, vol. xviii.
E. Mairinger. Jahrbuch der Wiener k. k. Krankenanstalt, 1896, vol. ii. p. 354.
Pilliet and Vean. Bulletin de la Société Anatomique de Paris, 1896, p. 719.
C. A. Morton. British Medical Journal, October 17, 1896.
J. G. Adami. Montreal Medical Journal, 1897, p. 529.
E. Monnier. Bulletin de la Société Anatomique de Paris, 1897, p. 38.
N. Lurier. Wratsch, 1898, p. 30.
Rolleston and Marks. American Journal of the Medical Sciences, October, 1898.

REVIEWS.

A Practical Treatise on Medical Diagnosis for Students and Physicians. By John H. Musser, M.D. Third edition. Revised and enlarged. Philadelphia and New York: Lea Brothers & Co., 1899.

Introduction to the Outlines of the Principles of Differential Diagnosis, with Clinical Memoranda. By Fred. J. Smith, M.A., M.D. (Oxon.), F.R.C.S. (Lond.). New York: The Macmillan Co., 1899.

Diagnosis, which is, after all, the highest aim in medical science, has profited largely by the rapid advances in scientific investigation. The more accurate knowledge regarding the causes of disease and pathological anatomy, established by laboratory studies during recent years, is in itself an achievement deserving of the highest praise, but in the practical advantages to which it has been put in the way of more certain diagnosis merits thankful recognition from the clinician who has himself had little hand in furthering this part of his own immediate work. In point of fact, the clinician in the older sense has been pushed to the wall; he has ceased to be the useful member of the profession that he formerly was, and must acknowledge himself a mechanical agent applying the investigator's thought. It must not be supposed, however, that in a practical sense the modern clinician is a useless encumbrance. Never before has the art of medicine played so prominent a rôle; but the science, for all that, is paramount and is deserving of the highest praise. The days of clinical diagnosis in the old sense are numbered. The pathologist has taught us to look for the fundamental causes and nature of disease and to look with disfavor upon classification or diagnosis based upon anything but the recognition of the true essence of disease. The day of dropsy and icterus, singultus and spasm, of convulsions and flux, of albuminuria and colic, has long since passed, and the final hour of pleurisy, and laryngitis, and pneumonia, and nephritis is almost at hand. We require to know the form as well as the existence of inflammations and infections, and we have begun to realize the infinite variability of conditions outwardly similar but dependent upon diverse causes. The putrid sore-throat of Brettoneau and the older authors has given place to a group of affections including Klebs-Löffler infection, streptococcic inflammation, and ulcerative tonsillitis of various sorts. The weak heart of the middle of the century has become myocarditis, myocardiac degeneration, and various nervous disorders; and pleurisy presents a varied picture, according to its special microbic cause.

The clinician has not been slow to apply the knowledge furnished by the pathologist and investigator, and is fully alive to his responsibilities in recognizing the varying significance of clinical conditions such as have been cited. Diagnosis has gone far beyond the stage of setting for itself merely the problem of recognizing superficially the gross lesion; the ultimate causes and the far-reaching consequences of primary disorders are as much the objects of search as the most obvious condition, and often of greater importance. The valuable investigations of Gull and Sutton on arterial disease and the innumerable contributions of bacteriologists on the general results of infection may be cited as typical examples showing the wide-spread results of conditions that may in the beginning be more or less local. The clinician who recognizes only a weak heart, or a damaged kidney, or a defective central nervous system in a case that is primarily one of arterial disease, with secondary disorder of heart and kidney and brain, falls as short of his duty as the surgeon who sees only a bone lesion when secondary infective disease of the joints and endocardium and kidneys has carried the case beyond the reach of surgical relief. To summarize the whole matter we must recognize the dependence of diagnosis upon bacteriology, chemistry, and pathology; and we must realize the importance of searching out not only the primary disease, but its cause and its consequences. It has been the custom to describe diseases as having certain symptoms and certain complications and sequels. In the future it is not too much to hope that with more accurate knowledge of the precise causes of pathological conditions and the mode of reaction of the organism, groups of cases will be recognized in which the primary symptoms will, perhaps, be common to all, and secondary symptoms (now ranked as complications and sequels) will be distributed among the groups according to the nature of the cause and the known conditions of the individual patient.

The mere labelling of cases can no longer pass for satisfactory diagnosis. A case will be no more accurately diagnosed when recognized as one of pneumonia than another to which the name of sore-throat has been applied; and not only will it be the duty of the physician to distinguish the form of pneumonia or sore-throat, but the stage, the progress, the associated pathological states in other structures, and the reaction of the organism as a whole will require accurate recognition. Diagnosis carried out in this broad sense will be useful diagnosis, as leading to rational and successful treatment. Therapeutics has become a much more creditable claimant for recognition as an exact science than formerly, though much remains to be accomplished; but treatment is likely to be effective in proportion to the accuracy of diagnosis. Those practitioners may hope to be recognized as successful therapeutists who perfect their diagnosis and whose diagnoses attain as nearly as possible to the comprehensiveness of those of the pathologist who carefully inspects every tissue and organ and records each defect.

To gain such proficiency in the recognition of pathological conditions during the life of the patient is no very easy task, and requires the greatest accuracy of perception with the broadest general experience and knowledge. The physician will be most successful who combines with the most thorough training in pathology and its auxiliary studies and in methodical clinical investigations an ability to form accurate inductions.

The book of Dr. Musser has deservedly reached its third edition. It in every way fulfils the requirements of modern diagnosis as we have briefly outlined them. "The object of diagnosis is to determine the condition of the living patient who may be suffering from disease. It implies not only that the phenomena of disease are detected, but also that the effects of disease on the organism are determined, and that the morbid process which is the cause of the phenomena is ascertained." These statements define very accurately the objects of diagnosis, and the author points out the importance of comprehensive knowledge of the phenomena of disease, of careful collection of data obtained by inquiry and by observation, without, as well as with, the aid of instruments of precision, and throughout the general and special parts of his work adhere closely to this plan of diagnostic investigation.

The book is divided into two parts, the former dealing with General Diagnosis, and including 400 pages; the latter with Special Diagnosis, the consideration of diseases of special organs or systems, and including 646 pages. This encyclopædic work includes practically all that is known of the subject of which it treats, and is most creditable to the author and American medicine. The descriptions of methods of investigation are full and accurate, and the author properly insists on the necessity of the modern methods of clinical examination, though we can hardly bring ourselves to believe that the day is near at hand when the average practitioner will have or need to have a clinical assistant.

It is scarcely possible to select from this work special points for comment, but we must at least mention the splendid illustrations. The charts illustrative of the visceral outlines in various diseases are well executed and highly practical. Not the least of their merits is their value in impressing upon students the necessity of making careful physical examinations in every case.

If there is any fault in Dr. Musser's book it is the amount of matter that has been included. Sometimes it is better to ignore a subject or a fact; too much detail may obscure the general plan of a building or a book. Again, in this attempt to include everything repetition is unavoidable in a book having a general and a special part.

Dr. Smith's book is very properly called "An Introduction to the Outlines of Differential Diagnosis," though we cannot see the necessity of retaining the word differential. In comparison with Dr. Musser's work this one is unpretentious, but it has the same fundamental recognition of the true objects in diagnosis, viz., the discovery of the ultimate causes and the exact nature of disease rather than the mere naming of the chief complaint. As an illustration of this method of presenting the subject we may refer to the part dealing with acute pleurisy. The author first refers to the symptoms and physical signs, then to the causes, which are divided into general and local; next the symptoms and physical signs of pleuritic effusion are discussed, and the causes of pleuritic effusion and hydrothorax are presented. Finally, when the student has come to the recognition of the existence of pleural effusion in a certain case, he is given the following sound instruction: "A general review of the above paragraphs leads to an inevitable conclusion that pleurisy and pleuritic effusion must in almost all cases be reduced to the rank of a symptom, possibly it may sometimes rise to the dignity of an independent disease, and as a symptom it may occasionally possess the importance of causing a fatal event; but, on the whole, its features and pathology must be analyzed from the point of view of what lies behind, and not as the 'be all and end all' of a diagnosis." Throughout the book the same attention to ultimate diagnosis is suggested, and the outlines of thorough methods and sound principles are laid down. It is, of course, inevitable that in a work of this size (341 pages) only an introduction to the subject can be included, but the value of that which is presented is limited only by the space and not by the form in which it is set forth.

A. S.

RHINOLOGIE, LARYNGOLOGIE, UND OTOLOGIE, IN IHRER BEDEUTUNG FÜR DIE ALLGEMEINE MEDICIN. DR. MED. E. P. FRIEDRICH. Berlin: C. W. Vogel, 1899.

RHINOLOGY, LARYNGOLOGY, AND OTOLOGY IN THEIR RELATION TO GENERAL MEDICINE.

THE German scientific mind is realizing the vast importance of a correlation of the specialties in medicine with one another and with general medicine far more deeply than would seem to be the case in other countries. The work of Dr. Friedrich marks a great advance in this direction. It should be plain enough to everyone that as all specialties are merely outgrowths of general medicine, so they are all closely related to the parent stem and to one another. Yet practically this fact is continually being lost sight of, the specialist neglecting all features of his patient's case except those appertaining to his own field, the general practitioner not heeding symptoms presented by those organs which are regarded as constituting special fields of study, because he has not cultivated his powers of observation in those directions. It is to be feared the latter sin will increase further the study of the specialties as such is pursued. So many physicians are heard saying that they do not pretend to know anything about such and such a subject, because they cannot keep up with its advancement. If they can but be brought to realize how much is to be gained by the examination of these organs by the ordinary simple methods of technique required, and what an important bearing the result of such an examination may have upon the diagnosis and treatment of their patient's case, much will have been accomplished that will prove of inestimable benefit to physician and patient alike. Many are hampered in their free examination of the nose, throat, and ear by the very fact that they so seldom perform the manipulation, when in reality a very little practice is sufficient to render them quite proficient. Unfortunately, the tendency of the present method of teaching in most of our medical schools is to lead the student to regard the nose, throat, and ear as standing essentially apart from his other work, and bearing no intimate relation to it. They are "elective" subjects, not absolutely required to be studied before he can obtain his degree, and consequently he does not regard a knowledge of them as absolutely necessary in his later career.

It is as a remedy for this very evil that Dr. Friedrich's book has such an importance for all of us. He shows us how every organ and system of organs of the body may either affect the nose, throat, or ear, or in its turn be affected by lesions of those organs. The book is not intended in any sense as a text-book, nor as a guide to diagnosis or treatment. It does, however, possess the greatest value as a reference hand-book, and should be in the hands of every general practitioner, as well of those of every specialist in laryngology, rhinology, or otology.

It is written in such a manner as to render its perusal most interesting and full of suggestions to all, and it is to be hoped will undergo translation into English at an early day.

Dr. Friedrich has undertaken to cover a very large field, and he has performed his task in a most eminently satisfactory manner. He takes up in orderly sequence the diseases of the respiratory tract, the circulation, the digestive tract, the blood, the various constitutional diseases, such as gout and diabetes, the acute and chronic infectious diseases, renal diseases, affections of the skin and sexual organs, diseases of the eye, intoxications, and nervous diseases. Although there is a very extensive literature of the subjects he discusses, it is largely of a most desultory nature, and Dr. Friedrich is to be congratulated on the judicious manner in which he has culled that which is worthy of preservation from the rest. It is greatly to be regretted that, after the manner of foreigners, he has almost entirely omitted mention of the important work done by Americans, particularly the late Harrison Allen and Dr. J. N. MacKenzie. The latter sometime ago published a most exhaustive monograph on the relation between the sexual apparatus and the nose, in which the field discussed by Dr. Friedrich was very thoroughly gone over, and Dr. Grayson has written upon the same topic, yet no mention is made of their labors. Dr. Friedrich is particularly happy in his analyses of the facts bearing upon any particular point. His views are in accord with the most advanced scientific research, and are evidently based on large experience and much study. F. R. P.

---

1. An American Text-book of Surgery. Edited by William W. Keen, M.D., LL.D., and J. William White, M.D., Ph.D. Third edition, thoroughly revised. Philadelphia: W. B. Saunders, 1899.
2. A Treatise on Surgery by American Authors. Edited by Roswell Park, A.M., M.D. Second edition. Philadelphia and New York: Lea Brothers & Co., 1899.
3. The Practice of Surgery. By Henry R. Wharton, M.D., and B. Farquhar Curtis, M.D. Revised edition. Philadelphia: J. B. Lippincott Company, 1899.
4. Lectures upon the Principles of Surgery. By Charles B. Nancrede, A.M., M.D., LL.D. Philadelphia: W. B. Saunders, 1899.

The recent issue of new editions of several major surgical works speaks well for the enterprise of the Philadelphia publishers and of Philadelphia as a publishing centre.

In the present edition of the *American Text-book of Surgery* the authors have wisely omitted the chapters on the Surgery of the Eye and Ear, feeling that these subjects could not be treated satisfactorily in the limited space that could be allotted them. Many new topics have been introduced, however, touching upon subjects in which surgery has made advances in recent years; these include the subject of leucocytosis, serum-therapy, the use of dry heat at high temperature, modern operative interference for congenital dislocation of the hip, Allis' researches in dislocation of the hip-joint, lumbar puncture, the treatment of exophthalmic goitre, the surgery of typhoid fever, and the surgery of the stomach and ureters. The addition of these new topics, the revision and enlargement of the sections on Appendicitis, Fractures, and Gynecological Operations, and the addition of a number of new illustrations are the features which distinguish this from the previous edition.

Park's *Surgery*, by American authors, now in its second edition, appearing in a single volume instead of two, and in a somewhat condensed form, is another work worthy of most careful attention. In the present edition the subjects are not treated quite so fully, although they do not seem to have been cut down sufficiently to make the work any less attractive or useful to the student or practitioner.

The work has been revised to date, though no organic changes have been made. There are some chapters in this work to which attention should be called, because of their novelty in surgical works; these are the chapters on Auto-intoxication and on the Surgical Pathology of the Blood. Again, there are other chapters that attract attention because of the novel way in which the subjects are classified. Thus, one chapter is devoted to Surgical Diseases Common to Man and the Domestic Animals, another to the Surgical Aspects and Sequelæ of Other Infections and Diseases (such as pneumonia and typhoid fever), and another to Poisoning by Animals and Plants.

Wharton and Curtis' *Practice of Surgery* in its revised edition has undergone certain changes that have suggested themselves or have been suggested to its authors since the appearance of the first edition, only a year and a half ago. With these three major surgical works on the market, it would seem as though, for the present at least, the practitioner and the student were well supplied. That new editions of these works should so quickly follow one another speaks well not only for the popularity of the individual works and their editors but for the rapidity with which not all but many branches of surgery are making strides. These strides have been made possible or have been suggested by the knowledge that is being constantly supplied not only from the laboratory of the surgical pathologist but from that of the surgical bacteriologist as well. And if one stops to think a moment he will see at once that the advances that have been made in surgery have been chiefly in those topics that have to do with surgical diseases rather than with surgical injuries, except in cases in which the injury is complicated by infection. What has made these advances possible, therefore, is the scientific data that is being constantly added to the literature of the pathology and bacteriology of surgical diseases, and for this reason these subjects deserve a very prominent place and no scant consideration in the modern text-book of surgery. Surgical bacteriology and pathology have been spoken of together, because they must of necessity go hand-in-hand, inasmuch as the large majority of the so-called surgical diseases are the direct result of bacterial invasion. It is a prevalent idea that the introduction of antisepsis and asepsis, which made possible the so-called modern surgical technique, deserves all the credit for the brilliant achievements of modern surgery. While this might have been true a number of years ago, it is not altogether true at the present time, since surgeons have been employing the present technique for several years, and yet they are finding the field for operative interference almost daily growing larger; and why? Because they are able to formulate in a more rational and scientific manner the indications for or against operative interference; they have a clearer picture in their minds of the pathological processes that they are dealing with, and, therefore, they can with better judgment and with greater intelligence direct the treatment.

Excluding traumatism and tumor-formation, what morbid conditions are there, local or constitutional, that are not accounted for by bacterial invasion? Excluding, among the more chronic surgical affections, those due to tubercular, syphilitic, or gonorrhœal infection, or to the ray fungus of actinomycosis, and among the more acute conditions those due to the bacillus of tetanus, of anthrax, of malignant œdema, to the bacillus coli communis, to the more common pyogenic organisms, those of erysipelas, pyæmia, and septicæmia; excluding, too, those conditions regarded as sequelæ of infectious diseases, such as typhoid fever, pneumonia, influenza, scarlatina, dysentery, diphtheria; excluding all these, and what factors are left that play an important rôle in the etiology of surgical affections?

First and foremost, then, the student's attention and thought must be directed to the consideration of the pathological processes that are at work in surgical diseases, and to the consideration of as much bacteriology as will enable him to fully understand the multitude of conditions that affect the action of bacteria or their toxins upon the tissues. It is of the utmost importance, therefore, that the student in surgery should be first thoroughly grounded in the pathology of his subject. This is a phase of the subject that has not commanded the attention that it deserves; but just as the student in internal medicine is taught to-day that a knowledge of at least the principles of pathology is all essential for a proper understanding and management of diseased conditions, so the student in surgery must be impressed with the importance of his first familiarizing himself with the morbid processes that affect the tissues in the so-called surgical diseases. Let us now look into the way in which the modern text-book is arranged.

In the *American Text-book of Surgery* the subjects treated in Book I., under the heading General Surgery, are surgical bacteriology, inflammation, tissue repair, the traumatic fevers, suppuration and abscesses, ulceration and fistula, gangrene, septicæmia, pyæmia, erysipelas, tetanus, scurvy, tuberculosis, rhachitis, syphilis, and tumors. In other words, without regard to special systems, as the osseous or the vascular, or without regard to the regions of the body, the lesions which are met with in surgical subjects, whether of traumatic or infectious origin, are taken up and treated in rotation. Book II. of the *American Text-book* is devoted to Special Surgery—that is to say, to the special systems, the osseous, the lymphatic, the vascular, and so on. Book III., to Regional Surgery, and Book IV., to Operative Surgery, including anæsthesia, plastic surgery, ligature of vessels, operations on bones and joints, minor surgery, etc. This makes not only a convenient but a very useful subdivision of the work, and allows of the subjects being classified in a methodical way.

Park in his *Surgery*, by American authors, subdivides his book in a way that commends itself very favorably to the critic. Part I., entitled Surgical Pathology, includes the chapters on Hyperæmia, Surgical Pathology of the Blood, Inflammation, Ulcer, Ulceration, and Gangrene. Part II., Surgical Diseases, includes chapters on Auto-intoxication, the Surgical Fevers, and Septic Infections; Surgical Diseases Common to Man and the Domestic Animals—such as glanders, tetanus, actinomycosis, hydrophobia, anthrax, etc.; Syphilis, Shock, and Collapse, Surgical Sequelæ of Other Infections and Diseases—such as dysentery, cholera, pneumonia, grippe, measles, typhoid, and diphtheria; acute intoxications, including delirium tremens. Part III. is given up to Surgical Principles and Methods, with chapters on the Control of Hemorrhage, Minor Surgery, Anæsthesia, and Surgical Diagnosis.

Part IV. takes into consideration the subjects of Injury and Repair, properly treated under a head separate from that of surgical diseases. Part V. and Part VI. are devoted respectively to the Surgical Affections of the Tissues and Tissue Systems, and to Special or Regional Surgery, thus corresponding very largely to Books II. and III. of the *American Text-book.*

The question as to whether or not the value of a book is affected by the management or subdivision of its subject-matter suggests itself just at this time; and if any general subdivision into parts or books is advisable, on what basis should it be made? To answer this question one must consider for a minute the present status of the pathology of inflammation. It was at one time thought that a certain amount of inflammation attended of necessity the healing of wounds and the repair of tissues in general, but there are no advocates of this theory among the surgeons of the present day. It was also believed in times past that tissues subjected to traumatism were also the seat of inflammation, which might or might not go on to resolution, with or without destruction of tissue. And so the suffix "itis" was added to the name of the tissue affected, to signify the presence of inflammation in that tissue; thus periostitis or synovitis were employed, whether the affection was due to traumatism or to infection. This nomenclature of surgical diseases has been in use so long and has been so universally adopted that it would be difficult now to make any radical changes. There are still some amongst those who have given the matter careful consideration who believe there is no demonstrable microscopical difference between the lesion as seen in injury and that as seen in disease; but as opposed to this class there is a newer school growing up which maintains, from the stand-point of pathology, that there is a distinction between the morbid processes that attend tissues subjected to traumatism alone and those subjected to infection. This school admits of no definition of inflammation which disregards the element of infection in its etiology, and has come to regard inflammation and infection as being, in a measure, synonymous terms. While the experimental pathologist claims to have demonstrated evidence of inflammation in the absence of infection, the surgeon of this modern school finds it necessary to disregard this laboratory demonstration in order to explain or account for the phenomena, as he views them from both a clinical and a pathological stand-point. Is it, therefore, justifiable to recognize this distinction between the effects of injury and disease, or traumatism and infection? And if so, would not this form the basis of a practical and systematic classification of surgical affections? If such a distinction exists the student should be taught to dissociate these two ideas from the start when he is studying the principles before he is taught to apply them to special regions or tissues.

If there is any great difference between the *American Text-book of Surgery* and Park's *Surgery,* by American authors, it would seem to be in the manner in which surgical affections are classified. In the *American Text-book of Surgery* inflammation is defined as "a disturbance of the mechanism of nutrition affecting the structures concerned in this function." "It is the response of living tissue to injury." "As a result of this disturbance, however, we have conditions favorable for the process of repair or for the neutralization or removal of the primary microbic cause," while in Park's *Surgery* we read: "Inflammation is an expression of the effort made by a given organism to rid itself of or render inert noxious irritants arising from within or introduced from without," and throughout the work a distinction is maintained between hyperæmia and inflammation, the term inflammation being reserved for those disturbances that have been excited by bacteria themselves or by their products. Thus in the chapter devoted to the Surgical Diseases of the Osseous System, Park treats: I. Acute Osteomyelitis. II. Periostitis. III. Epiphysitis, each as an infectious process, due either to the (*a*) staphylococcus, (*b*) streptococcus, (*c*) pneumococcus, (*d*) bacillus tuberculosis, or (*e*) to miscellaneous organisms, as the colon bacillus. In the *American Text-book of Surgery* the inflammations of bone are said to be acute or chronic, to be consequent upon injury, upon diathetic states (tuberculosis), upon a general infective disease, as typhoid fever, or upon the presence or absence of pyogenic organisms. Inflammations are considered under the heads of osteoperiostitis and osteomyelitis; the causes of the former are trauma, strains, contiguous inflammations, or special infections, and of the latter the causes are local, general, or septic. Acute osteitis is said to be simple—*i. e.*, consequent upon traumatism, or septic. These particular chapters illustrate very well the point that is being made, namely, that in one traumatic lesions are not considered under the head of inflammations, while in the other no such distinction is made.

If in the construction of a modern text-book it is well to draw a sharp line between the effects of injury and those of disease upon the tissues, the book should begin with the chapters on the injury of tissues and their repair, including not only all that has to do with the local, but also what concerns the constitutional effects of injury. The latter should, however, include only those that are not secondary to infection. These chapters would, therefore, embrace the subjects of contusions and wounds, all the methods of tissue repair, traumatic or septic fever, collapse and shock, traumatic delirium, etc. Part II. should then take up the subject of surgical bacteriology, which must of necessity precede any discussion of inflammation; the latter could then be fully discussed —its local as well as its constitutional manifestations—such as those of septicæmia and pyæmia. Then should follow the chapters on diseases due to the specific infections, as tuberculosis and actinomycosis, anthrax and glanders, tetanus and hydrophobia, syphilis and gonorrhœa. Part III. should be devoted to tumors alone. The student has then been carried in a systematic way through a course that has furnished him with the fundamental principles of the morbid processes that lie at the bottom of all surgical affections, and he is prepared to go on to Part IV., which takes up diseases and injuries of tissues and tissue systems —that is to say, he is by this time familiar with the three factors that account for practically all surgical affections—traumatism, infection, and tumor formation—and is now ready to be instructed to apply his knowledge of these morbid processes to the individual tissue. Part V. should be devoted to Regional Surgery, where the student will have an opportunity to review the diseases that affect certain regions of the body, as distinguished from the special tissues of the preceding chapters. Here the field broadens; the discussion is not limited to any one morbid process, as tuberculosis, or to any one type of tissue, as bone, but embraces all the structures occupying certain regions of the body. The book should conclude with Part VI., devoted to Operative Surgery, including anæsthesia and all minor and major surgical procedures.

In Wharton and Curtis' *Surgery* there is no subdivision of the work into various parts; the early chapters are taken up with the topics relating to inflammation; these are followed by a chapter on the Repair of Wounds, although the chapter on Wounds does not appear until after Tumors, conditions affecting the results of injuries and operations, asepsis and antisepsis, and minor surgery, have each in turn been discussed. Then follow Plastic Surgery, Anæsthetics and Amputations. The remainder of the book conforms in its arrangement to that of the other works under discussion. It is difficult to make a comparison of the intrinsic merits of these three general surgeries, because each represents in the main the teachings of the surgery of the day. Comparisons can be drawn between individual chapters, however. One chapter in one work will not compare so favorably with one in another; the original illustrations of a particular subject in one work are, perhaps, more instructive than those in another, or in one the sequence in which the subjects are discussed seems more rational and more methodical. Other things being equal, the work to which a number of appropriately selected men have contributed should have a greater value than that compiled by only two authors. That the text-books of to-day should be the product not of an individual but of a number of authors is the outcome of the rapid expansion of the field of surgery and of the rapid strides which this branch is making. Individual surgeons who have had exceptional opportunities in particular lines are called upon to contribute the results of their more varied experience. This should enhance the value of a book, as it makes it particularly a work of reference—one in which the subjects have been treated by those who have devoted to them more than the average time, and whose views, therefore, demand respect. If it is to be a work of reference, the names of the authors should be attached to the chapters for which they are responsible, in order that the readers may know upon whose authority such and such statements are made. While there will always be a demand for good text-books, it is to be hoped that in the future the leading men of the profession will not confine their literary exertions to contributions to text-books; for these articles are, at best, but a brief and systematic presentation of but the essential facts of a particular subject. It is to be expected, rather, that they will contribute monographs on subjects selected from the field in which their experience has been richest—an exhaustive treatise upon that subject on which they can write authoritatively. In such works as these the surgical literature of America is poor.

Nancrede's *Principles of Surgery*, embodying his lectures on the subject delivered at the University of Michigan, is a volume of 384 pages, in octavo form. The author is deserving of the highest praise for the manner in which the subjects have been presented. The work itself is written in a scientific spirit; it has omitted mention of all that is obsolete, and it presents each subject in the light of the most recent scientific investigations. It treats of all the subjects that are to be found in a general surgery up to the chapters on Special and Regional Surgery. Such a course of lectures as are contained in this work should be of inestimable value not only to the student of to-day but to the graduate of past years. C. H. F.

THE SEXUAL INSTINCT, ITS USE AND DANGERS AS AFFECTING HEREDITY AND MORALS. By JAMES FOSTER SCOTT, B.A. (Yale), M.D., C.M. (Edinburgh). New York: E. B. Treat & Co., 1899.

THE PATHOLOGY AND TREATMENT OF SEXUAL IMPOTENCE. By VICTOR G. VECKI, M.D. From the Author's Second German Edition, Revised and Rewritten. Philadelphia: W. B. Saunders, 1899.

THESE two books are fairly representative of a comparatively recent development in medical literature. Whether the steady growth of such works, noticeable in the last year or two, is a result of a popular demand on the part of the laity, or whether it results solely from the earnest and sincere desire of the writers to enlighten the public upon certain matters, about which they know so little, it would perhaps be hard for us to determine.

There does seem to be of late a wide-spread desire on the part of men of eminent scientific reputation to issue works of this character.

This propaganda has received, we understand, a severe setback at the hands of a stern British public, and as a result of this sudden spasm of morality a well-known writer and expert in criminology has been imprisoned and his book suppressed, the natural result being an increased demand for the volume in this country.

As a matter of fact, a writer who undertakes such works stands upon very delicate ground, and must proceed very circumspectly if he wants to avoid laying himself open to the charge of writing for the general public. Dr. Scott, however, clears his own skirts in this matter by frankly announcing in the preface to his book that it is "intended primarily for laymen—not for women or boys." Does it ever suggest itself to the doctor's mind that it will be an extremely difficult, if not impossible, task to keep his book out of the hands of women and boys.

There can be no doubt whatever about the author's honesty of purpose in writing this little work. Much of it is true, and all of it will prove novel and interesting reading to the laity. We cannot see any advantage that the medical man would gain from its perusal. The author's object is to preach a powerful crusade against the prevalent sexual immorality of the day, and to make a fervent appeal to men for chastity of both mind and body. We can but feel that upon some points the good doctor is too pessimistic; for example, when he puts in displayed type cross the middle of a page, "Venereal patients are to all intents and purposes poisoned animals."

We also fail to see in a book "written for laymen only" the necessity of devoting fully one-third to a scientific treatise upon gonorrhœa and syphilis. How much good is accomplished by a work of this kind it is difficult to say. One thing is sure, that if only one-half of the warning notes sounded in Dr. Scott's book were heard the result would be a decided betterment of the human race.

The treatise on sexual impotence by Dr. Vecki represents an entirely different type of work. It is thoroughly scientific and written for the profession only. One feels certain that the author has the courage of his convictions, and is not the least afraid to give voice to them. That he feels that some of the profession may shrug their shoulders and hold themselves aloof from his book is evident in his introduction, a most delightful chapter, by the way, where he states that "to write such a book is a venturesome undertaking under all circumstances; but to write without the customary affectation and hypocritical rolling of the eyes, to speak the bare truth, surely requires even greater courage."

The whole subject of sexual impotence and its treatment is discussed by the author in an exhaustive and thoroughly scientific manner. We were, however, struck with the fact that the distinguishing points in the differential diagnosis between spermatorrhœa and prostatorrhœa were by no means made as clear as they should be, the impression being given that spermatorrhœa is not at all an uncommon affection. This is hardly in accord with the position of most genito-urinary surgeons in regard to this matter at the present day, true spermatorrhœa being in reality rather a rare affection.

Taking the work as a whole, however, we consider it the best we have seen upon the subject, and take great pleasure in recommending its careful and thoughtful perusal to all our readers. H. M. C.

THE READY REFERENCE HAND-BOOK OF DISEASES OF THE SKIN. By GEORGE THOMAS JACKSON, M.D., Professor of Dermatology, Women's Medical College of the New York Infirmary and in the Medical Department of the University of Vermont; Chief of Clinic and Instructor in Dermatology, College of Physicians and Surgeons, New York. New (3d) edition, in one 12mo. volume of 638 pages, with 75 illustrations and a colored plate. New York and Philadelphia: Lea Brothers & Co., 1899.

THE third edition of Dr. George Thomas Jackson's text-book fulfils amply the promise of its predecessors. Although but three years have elapsed since the second edition was published, we note that the revision is fully up to date. New sections have been written on bulpiss, bunion, dermatitis from Röntgen rays, blastomycetic dermatitis, ecphyma globules, lupus pernio, pityriasis alba atrophicans, and idiopathic multiple pigmented sarcoma. Almost forty more pages of text and six new illustrations have been added to this edition, and the book on the whole represents that care which Dr. Jackson's articles have always shown.

We can heartily recommend this book to the student and practitioner of medicine as one of the best of the medium-sized text-books on diseases of the skin. C. A. D.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,
PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

The Excretion of Methylene-blue in Normal and Pathological Kidneys.—CZYHLARZ and DONATH (*Wiener klin. Wochenschrift*, 1899, No. 24) report some observations that do not altogether agree with those of the earliest experimenters in the same line, and show that the method has little practical value. They proved in the first place, by experiments on dogs, that the dye gave as trustworthy results when given by the mouth as when given hypodermatically. They then gave the drug to patients with and without renal disease, and examined the urine every twenty minutes until the green color appeared. The duration of the color was then tested at longer intervals. The results are given in tabular form. They show that in nephritis there is a retardation of the excretion of methylene-blue. This may be due either to delayed beginning or to slow excretion, or to both factors. Delayed beginning was seen in a marked degree only in two cases of contracted kidney, whereas in four other cases the reaction was normal. In other forms of nephritis the time of appearance was within normal limits. The various forms of renal disease showed no differences in regard to slowness of excretion, and the observers could only say that such slowness was more common in nephritis than in health, but not peculiar to the former.

Peritoneo-pericardial or Pseudo-pericardial Peritoneal Friction.—ORTNER has had the unusual experience of seeing five cases of this condition within a short time, and his account (*Wiener klin. Wochenschrift*, 1899, No. 26) should assist others in the diagnosis. In these cases there is a peritoneal friction sound with the rhythm of pericardial friction. The rhythm is at times triple, sometimes to-and-fro, sometimes only systolic. In some the friction could be heard between the phases of the heart's action. In no case was there palpable friction. Another point of resemblance to pericardial friction is the fact that full inspiration or pressure causes the sound to be more intense. In general, variations in intensity are common. The friction may be audible all over the pericardial region and as far as the left axilla, but is most frequently heard over the lower part of the sternum and to the left. In the latter case the differentiation from a pericardial friction is of course less difficult than otherwise. A more useful point in the diagnosis is furnished by the etiology. In all the cases hitherto observed there has been a fibrinous or fibrino-tuberculous peritonitis between the liver and diaphragm, or the diaphragm and adjacent intestines, the friction being produced by the forcible impulse of the heart against the rough surfaces.

Changes in the Blood in Latent Malaria.—A. PLEHN (*Berliner klin. Wochenschrift*, 1899, No. 25) describes some observations on the blood in Cameroon. Plehn was struck by discovering evidences of anæmia in a large number of the persons under his medical control, and on examining the blood he discovered peculiar bodies in the corpuscles. Stained with hæmatoxylin certain of the red corpuscles, otherwise unchanged, were seen to contain more or less numerous round or roundish, bluish spots. Sometimes these were arranged in pairs, occasionally they projected over the periphery of the blood-corpuscle. The stained bodies varied in size, but were usually less than one-third of a micron in diameter. As many as from six to twenty could be found in a corpuscle. At times, when the blood was undergoing degeneration, the bodies could be found in the plasma. No differences of structure could be made out. Methylene-blue stained the bodies, but not so well as hæmatoxylin. In fresh and unstained preparations they could not be seen. The number of corpuscles containing these bodies increased until the first malarial paroxysm, and after that the granules diminished notably or disappeared entirely. They then increased again in size and number. Plehn proposes to call these bodies karyochromatophile granules, on account of their affinity for nuclear stains. They occur months and even years after the affected person has left the malarial district and after the last malarial paroxysm. This fact indicates that they reproduce themselves in the blood. Plehn considers the organisms capable of proliferation, and sees in them the germs of the malarial parasite, which first undergo division in red blood-corpuscles, lead to the destruction of the latter, and then either degenerate in the plasma or go on to further development in other blood-corpuscles. Plehn believes that he has seen the transition forms, from the small bodies to plasmodia, in preparations taken two days before the first malarial paroxysm. He found similar bodies in the blood of people living in malarial districts near Rome, and also in sailors who had been in tropical malarial countries. Plehn also considers that these bodies represent the actual cause of malarial hæmoglobinuria, producing a disposition which under an exciting cause leads to a paroxysm. He therefore rejects the idea of distinguishing various groups of hæmoglobinuria. Plehn rejects the quinine treatment of black-water fever, not because the quinine is dangerous, but because of the extraordinary tendency to spontaneous recovery. The systematic administration of quinine, he claims, gives protection not only against acute febrile attacks, but also prevents a too active growth of the karyochromatophile granules, and in that way lessens the tendency to hæmoglobinuria. Plehn also denies that direct infection through certain kinds of mosquitoes is the only way of acquiring malaria, basing this on his observations in Cameroon. It is not to be wondered at that Plehn's statements were received with incredulity in the Berlin Medical Society. He energetically denied the possibility of mistaking artefacts for organisms. Whether he also escaped the risk of mistaking such bodies as can be found in anæmic blood in non-malarial localities is by no means sure. Virchow's hope that Plehn on some future occasion would be able to produce more decisive observations will no doubt be generally shared.

Congenital Myxœdema.—SKLAREK (*Berlin. klin. Wochenschr.*, 1899, No. 16) refers to the great rarity of this disease in Berlin, and describes the following case with the brilliant results of treatment with thyroid extract: The patient was a girl, aged seventeen years. The father was a drinker, the mother healthy, but during pregnancy worked hard and suffered from worry and excitement. There was no family history of mental, nervous or Basedow's disease. The patient appeared normal until six months old, when a vesicular eruption covered the entire body. When a year old the relatives noticed that the child had not grown, and that the body was ill-shaped, the face was thick and limbs bulky. The patient spoke her first word in the third year, with a nasal voice. She learned to walk in her seventh year. Intelligence was very slight. An attempt at instruction in an idiot asylum proved negative, and she was transferred to a lunatic asylum, when treatment with thyroid extract was begun. At the beginning of treatment the condition was as follows: Weight, 15.35 kg.; height, 80 cm.; circumference of oval symmetrical cranium, 50 cm.; small transverse diameter, 11 cm.; great transverse diameter, 13 cm. The anterior fontanelle was open. The hair was blonde and very scant, entirely absent behind. There was a scaly eczema on the scalp. The skin was livid, hands and feet bluish-red, of a doughy consistency, but without distinct œdema. On the hands and feet the skin was thickened, wrinkled, and scaly. The face was angular, swollen, and had a demented expression. The nose was of the saddle type. The mouth was always open, and saliva continually ran over the snout-like lips. The teeth were very defective. The somewhat enlarged tongue could not be protruded well. The neck was very short. Masses the size of goose-eggs and of the consistency of dough projected from the supraclavicular fossæ and the anterior axillary lines above the nipple. The thyroid gland could not be felt. There were numerous small glands between the sternocleidomastoid and the cucullaris muscles. The thorax was barrel-shaped, lordosis was marked, making the pendulous abdomen still more striking. There was an umbilical hernia. The external genitals were infantile; axillary and pubic hair absent. The patient had not menstruated. The limbs were bulky and the hands spade-shaped. Movements were sluggish, and the patient required support in walking. The temperature was below 36° C. Sensibility to pain was acute all over. Speech was very nasal and rough; the patient spoke little spontaneously, but repeated words she had heard; seldom answered questions. August 1, 1897, treatment with thyroid extract was begun. The dose at first was small, and given at infrequent intervals, but gradually increased, so that in nine weeks eighty tablets (0.1) were taken.

During this time the patient grew 3 cm.; the cyanotic color of the skin disappeared; the swelling of the skin diminished; the body-weight decreased 1.9 kg.; the temperature rose from 36° to 37°; pulse from 88 to 100 and 120. Larger doses (0.324) were now given up to six tablets daily. When vomiting and headache resulted the number was reduced to four and five for several days, then the former number administered. After sixteen months of treatment the height had increased 14 cm., weight 21 kg., the fontanelle had closed; there was a heavy growth of new hair, the scalp and skin were smooth, the face well proportioned, and expression pleasant. New teeth replaced the carious ones, and the tongue was movable. The swellings in the axillary regions disappeared, lordosis and pendulous abdomen became much less marked. The hernia disappeared, the limbs were well proportioned, and the patient could walk and run without support. Puberty, however, was not established, and the swellings in the supraclavicular regions were only slightly changed. The mental condition improved remarkably. The patient spoke spontaneously, answered simple questions, and knew right from wrong. However, on omitting treatment for two weeks the symptoms returned. Administration of 200 oöphorin tablets (Freund) failed to produce menstruation. Renewed treatment with thyroid was again followed by improvement.

The Gelatinous Form of Sodium Biurate, and Its Bearing on the Pathology and Treatment of Gout.—LUFF states that although there may be some difference of opinion as to the actual source or sources of the compounds of uric acid met with in the blood of gouty patients, yet there can be no doubt, from the researches of Sir William Roberts, that the uric acid when first introduced into the blood exists solely as the sodium quadriurate. The sodium quadriurate is, in the dissolved state, very unstable, and soon changes into the sodium biurate, which is not immediately precipitated, because it at first assumes the form of the gelatinous biurate, in which form it is a much more soluble compound than the crystalline biurate.

Luff conducted a series of experiments with sodium and potassium bicarbonate with the object of determining which of the salts caused the more rapid conversion of the gelatinous biurate into the insoluble crystalline biurate. The experiments were carried on with blood-serum containing 1.5 per cent. of gelatinous sodium biurate. Varying amounts of sodium bicarbonate and potassium bicarbonate were then added, and the rapidity of the appearance of the crystals of the insoluble biurate was noted. He found that the more of the sodium bicarbonate there was present the more rapidly did the crystals of the biurate appear. With the potassium bicarbonate he obtained just the opposite results.

From his experiments Luff draws the following conclusions: "The higher the alkalinity of the blood from the presence of sodium bicarbonate, the more rapid and the more complete is the conversion of the soluble gelatinous biurate into the comparatively insoluble and crystalline form. In connection with this point it is instructive to bear in mind that mineral waters rich in sodium bicarbonate are well known to accelerate an attack of gout in many gouty subjects; and it is also of interest to mention here that from some observations that I have been conducting for the past eighteen months on the alkalinity of the blood of gouty patients, the results of which are not yet published, I have so far found in every gouty patient that I have examined that the alkalinity of the blood is higher than the average alkalinity of the blood of healthy individuals, and since this increased alkalinity is due to a higher proportion of sodium carbonate or bicarbonate, it can be understood, in the light of the present investigation, why such blood is prone to hasten and to augment the formation of gouty deposits. On the other hand, it is seen that when the increased alkalinity of blood serum is due to the presence of potassium bicarbonate, the conversion of the gelatinous biurate into the crystalline variety is delayed as regards time, and is considerably diminished as regards quantity, thus explaining the well-known beneficial effect of the alkaline potassium salts in the treatment of acute and subacute gout."—*British Medical Journal,* October 28, 1899, p. 1163.

An Experimental Contribution to the Study of Gout.—As the result of experimental work and the careful study of the metabolism in a case of gout, BAIN (*British Medical Journal,* October 28, 1899, p. 1164) comes to the following conclusions:

1. That the methods in vogue for separating uric acid from blood are not sufficiently delicate for the detection of minute quantities.
2. That the phosphoric acid varies directly with the uric acid excretion, the patient being on a fixed diet.
3. That the alloxur bases in gout are not increased.
4. That colchicum does not seem to have any influence on the excretion of uric acid in gout.
5. That sodium salicylate and thymus increase the excretion of uric acid in gout.

Tuberculous Neuritis.—WILSON (*Quarterly Medical Journal,* November, 1899, p. 46), from a review of the literature and after citing some personal observations of tuberculous neuritis, draws the following conclusions:

That a peripheral neuritis occurs sometimes in phthisis.

That it occurs in middle-aged patients and late in the course of the disease.

That the symptoms are mixed motor and sensory, but that the motor are the most typical and constant.

That whatever the symptoms may be, they vary much from time to time, and, as a rule, tend to get better.

That the paralysis is marked by much muscular atrophy, and that changes in the electrical reactions are present.

That the affection is probably due to a toxin produced by the tubercle bacilli.

That on histological examination of the nerves a marked neuritis is found, but no disease of the brain or spinal cord.

Granular Degeneration of Red Blood-cells.—E. GRAWITZ (*Deutsche medicinische Wochenschrift,* 1899, No. 36) has investigated the basophile granules found at times in red blood-corpuscles, incited by the statements of A. Plehn. Grawitz, after examining the preparations of Plehn, was able to discover bodies like those described by the latter in the blood of a patient with tertian intermittent, occurring in Germany, also in the blood of Cuban malaria. In examining non-malarial blood stained by eosin and hæmatoxylin, and also by Ziemann's eosin-methylene-blue mixture, he was able to find somewhat similar bodies, usually in larger numbers than in malaria. Stained by Ehrlich's triacid mixture and other common methods the bodies were not so easy to find, which explains the scanty references to these bodies on the part of previous observers. Grawitz found the bodies most numerous in cases of cancer of the stomach with severe anæmia, in cases of progressive anæmia with or without evidence of previous disease, in various suppurative diseases, including pleural empyema, puerperal sepsis, in leukæmia, and sparingly in a child with chronic diarrhœa. Healthy persons, those with tuberculosis, chlorosis, diabetes, measles, and so-called pseudoleukæmic anæmia gave negative results. Although the bodies found by Grawitz in non-malarial blood closely resembled those described by Plehn, he was not able to convince himself that they were identical, and admits that the problem will have to be solved in tropical countries by comparative examinations. The polychromatophile degeneration cannot be confused with that now described by Grawitz, nor can it represent the earlier stage of the granulations. Both processes may be found in the same blood. In trying to interpret the bodies it is important to know that Grawitz found them only in diseases characterized by pronounced degeneration of the red blood-cells. That the granulations are the result of karyolysis Grawitz rejects, because in the majority of his cases nucleated red cells were absent, and because prolonged search failed to show transition stages from karyolysis to the basophile granules. Grawitz therefore concludes that the granules depend on a degenerative process in the hæmoglobin caused by the poisons in the various diseases. If this view proves to be correct the granules will be of considerable importance in clinical diagnosis, indicating whether the anæmia is due to substances which destroy the blood corpuscles particularly or whether it is only part of the general atrophy. It may also be of value in distinguishing between regenerative and degenerative processes in the blood cells.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL;

ASSISTED BY

ALFRED C. WOOD, M.D., AND C. L. LEONARD, M.D.,

INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

Choledochotomy without Suture.—REYNIER (*Rev. de Chir.*, November, 1899) reported an interesting case which sustains this method of treating wounds of the ductus choledochus, which are necessitated by the removal of calculi that are impacted in it. It shows that it is not essential to suture such wounds, but that it is sufficient to provide adequate drainage and wall off the peritoneal cavity.

The case reported was that of a woman forty-four years old, who had suffered from undiagnosed attacks of pain for twelve years, until she at last showed slight signs of icterus. The attacks became finally more frequent, losing their gastric character and becoming hepatic. The alteration in the symptoms led to the diagnosis of impaction in the ductus choledochus. She became thin, a little cachectic, with an icterus that was pronounced and general; palpation of the abdomen was painful; a mass was detected which made a localized peritonitis beneath the liver probable. The liver was not augmented, nor the gall-bladder distended; the urine was icteric and the stools decolorized.

The operation disclosed a calculus of large size in the duct, which was surrounded by such a mass of peritoneal adhesions as to limit the field of operation. The duct was incised, the calculus removed, drainage secured, and the patient recovered completely.

The Diagnosis of Appendicitis.—ROUX (*Rev. de Chir.*, November, 1899) says that too much dependence should not be placed upon the so-called pathognomonic signs of appendicitis. He affirms that in depending upon these signs one runs in danger of grave errors, and he thinks it is dangerous to operate immediately in the early stages of the disease. There is danger, even when the diagnosis is correct, of operating at an inopportune moment in a benign case which has a tendency to become encysted, and the operation might be much better done later. It is dangerous to operate as soon as the diagnosis is established in every instance. The moment for intervention should be well chosen. Wait till the peritoneal reaction has subsided. There is a proper time to operate in all cases, and immediate operation is folly in some.

The Advantages of Posterior Y-shaped Gastro-enterostomy.—PAUTALONI (*Rev. de Chir.*, November, 1899) reported the results of fifteen gastro-enterostomies which he had performed by this method during the year preceding. He prefers it to all other methods, and is borne out in his view by the excellent results obtained.

He employed sutures alone, not even employing the button for the duodeno-jejunal anastomosis. The method used was that described by Roux. He groups the advantages of this method as follows: 1. The facility with which the stomach can discharge the mass of food directly into the jejunum. 2. The impossibility of regurgitation through the duodenum. 3 The absence of regurgitated bile in the stomach.

The essential feature of the operation, which is not as difficult as some say, is to sustain the patients' strength during the first forty-eight hours. This he does by permitting them to eat immediately, and as a consequence they are out of bed at an early period.

The object sought is the establishment of a new pylorus which has good function. This is obtained in an ideal fashion by this method. He believes it to be the most logical, and the one which satisfies most fully the demands of the surgeon.

The Utility of Early Intervention in Pathologic and Traumatic Fractures of the Spinal Column.—DELAGENISRE (*Rev. de Chir.*, November, 1899) believes that the general procedure of waiting for developments in cases of injury to the spinal column should be abandoned, because many of these lesions can be repaired if operation be performed soon enough. Simple compression of the spinal cord, submeningeal ecchymoses, interstitial hemorrhages, are all capable of treatment and cure if undertaken immediately. It is only the absolute severance of the cord that cannot be repaired by suture.

At the time of the accident all of these lesions present the least opposition to repair. The surgeon should not wait for the compression to become permanent; the injury does not become lasting unless the compressing agent is permitted to remain.

The rule should, therefore, be to operate as soon after the accident as possible; if the operation is delayed too long it means the chance of being ineffectual.

The author reports two cases. In one the operation was undertaken immediately. The lesion was severe, but repair took place, followed by complete recovery and the restoration of full motion and sensation. In the other the operation was delayed, and he found a condition which could have been relieved by an early operation.

Three Cases of Perineal Resection of the Rectum for Carcinoma.—HALSTEAD (*Chicago Med. Rec.*, December, 1899) reports three cases which he operated upon by this method. Although the cases were too recent to allow of his drawing any inference regarding the final result of the operation, they illustrated the value of this method of procedure. The operation is an old one, and is known by the name of Lisfranc. It can be employed in all cases of cancer situated below the peritoneal fold. Cancers of the rectum beginning low down and extending above the level of the third sacral vertebra should be attacked either through the sacral or the abdominal routes.

The mortality from this operation is not as high, and the permanent results are better than in the sacral methods of rectal excisions. The results in the hands of the best surgeons were 18.7 per cent. of deaths from operation, and 10 per cent. lived three years after, or could be considered cured. The perineal method had an immediate mortality of 18 per cent., and the percentage of permanent cures was 14.8 per cent.

These statistics are somewhat misleading, as the cases were selected for the respective operations. The author believes that the perineal method is easier to perform and is not followed by so high a mortality. The functional results are also probably better. We must expect some loss of sphincteric control in most cases of excision of the rectum. Fairly good control of the bowels may be had if we carefully restore the relations of the levators ani to the rectum by suturing them to the stump after amputation.

Removal of a Bullet that had been Three Years and Seven Months in the Brain.—MONDOL (*Rev. de Chir.*, November, 1899) reported before the French Surgical Congress the case of a man who had attempted suicide. Three shots had been fired, one ball only was found and removed. Three years later his memory began to fail, and some other mental disturbance was present. At the same time febrile attacks were present, but without evident cause, as he could not tell of the former injury.

The skiagraph showed the presence of one bullet in the brain, and the patient entered the hospital to have it removed. He developed an attack of insanity during the night, and was transferred to an insane ward. He was, however, brought back, trephined, and a bullet removed which lay at a depth of four or five centimetres in the brain.

The result of the operation was a rapid and complete recovery.

The Prognosis and Surgical Treatment of Hæmaturia.—LAVAUX (*Rev. de Chir.*, November, 1899), after a study based upon a series of cases, concludes that: Spontaneous hæmaturia is a variety which is rarely fatal. Authors, both ancient and modern, agree in this, and much credence should not be given to cases so reported.

The prognosis depends entirely upon the cause.

Hæmaturia is not an indication for operation except in certain tumors of the kidney or in certain pedunculate or sessile tumors of the bladder. In the cases of cancerous infiltration of the bladder wall, the hemorrhage has no gravity under appropriate treatment. It has not been demonstrated that hæmaturia produced by tuberculosis of the urinary tract is of itself an indication for operative interference.

All operation is contraindicated in the cases of so-called essential hæmaturia.

Surgical intervention is only called for after the diagnosis has been fully and precisely established.

In the cases of hæmaturia due to a lesion of the bladder, the injection of very hot aseptic solutions into the bladder, as a saturated boric solution, will be found to render real service.

Cubitus Valgus Femininus.—HÜBSCHER (*Deut. Zeit. für Chir*, November, 1899), from a series of measurements on one hundred and twenty-five individuals, found that in men and boys the arm is nearly in a straight line with the forearm when in extension, as it is also in girls up to the age of thirteen years; after that age and in all women there is a physiological cubitus valgus which commences after puberty, and increases. The angle is greater in the right arm than in the left. In the female this angle is from 15° to 25°, and may reach even to 30°. These measurements are in accord with those of Patten. With the arms fully extended and the hand supinated the majority of women can place the ulnar borders of their forearms in contact for their entire length.

The practical application of these facts is seen in the surgical treatment of fractures that involve the lower end of the humerus. There are numerous cases in which a traumatic cubitus varus or valgus has resulted from the failure to recognize this peculiarity. By remembering this physiological fact, and that such a normal cubitus valgus is found in all females over the age of puberty, the bad results that frequently follow fractures in this region can be avoided. The old rule of comparing the injured with the sound arm should be followed in such cases, and the splint should be so shaped that it will conform to the normal of the individual case.

The Treatment of Varicose Ulcerations by Nerve-stretching.—CHIPAULT (*Rev. de Chir.*, November, 1899) says that the results obtained in cases of mal-perforant of the foot by the stretching of the plantar nerves led him to attempt the same method of treatment in cases of varicose ulcers.

The method employed consisted in two parts. The first was the stretching of the nerve supplying the skin area in which the ulcer was found. This nerve should be stretched at a point not far from the ulcer, nor too near, lest that the wound become infected. The nerves usually involved in these operations are the internal saphenous, either at the ring or in the upper portion of the limb; the sciatic, its popliteal portion either at the head of the peroneal or at its bifurcation. The stretching in these cases is limited to the musculo-cutaneous branches. This is the more common seat of these varicose ulcerations, and generally involves the musculo-cutaneous branches associated with the internal saphenous. It should be remembered that these nerves, when this condition is present, are more friable than usual.

The second part of the operation consists in curetting the ulcer and getting it aseptic; if the skin and surrounding tissue is much involved, or in excising the skin with the ulcer and then, after gentle traction and complete hæmostasis, sewing the edges together. The tightened skin exercises a beneficial influence on the varicose condition.

Compression of the Ulna Nerve by Callus Liberation. Recovery of Function.—GUILLEMAIN AND MALLY (*Rev. de Chir.*, November, 1899) report an interesting case in which fracture of the elbow was followed by compression of the ulna nerve by callus. The paralysis did not take place immediately, however. It was twenty-six years after the injury that the paralysis commenced to develop rapidly and became complete in four months. The nerve was not excited by stimulation, there were present the reactions of degeneration, with atrophy of the muscles. The dynamometer showed 5 kilogrammes in the injured hand and 38 kilogrammes in the sound hand.

The operation disclosed the nerve in a bony and fibrous canal. The nerve was apparently the subject of an acute neuritis. It was red, increased in volume, and irregularly swollen. The bony and fibrous canal was entirely removed. The amelioration of the paralysis was not evident till the end of six months, and was not complete till the end of three years. The patient then thought it was all but as good as before the accident. The dynamometer showed 32 in one hand and 40 in the other.

Antirenal Abscess.—LEJARS (*Rev. de Chir.*, November, 1899) reported four cases which have come under his care in which the symptoms were rather indefinite and it was impossible to determine the exact lesion before operation, and yet the operation disclosed the presence of an abscess of considerable volume, in each instance situated anteriorly to the kidney.

In the first case the condition was supposed to be a large perinephritic abscess, which was detected as readily in the side as posteriorly. The ordinary lumbar incision was made and the posterior surface of the kidney found, but no pus. Careful dissection over the external aspect of the kidney finally reached the abscess, which was situated anteriorly.

In two other cases a laparotomy incision disclosed the abscess anterior to the kidney, and in one case the mesocolon on the left side contained a large quantity of sero-purulent fluid which communicated with the deeper-seated abscess in front of the kidney.

One of these cases undoubtedly had its origin in an appendicular abscess. The other case was so clear in its development, and presented a rounded swelling anteriorly without perceptible fluctuation, that it was taken for a neoplasm.

These cases undoubtedly point to a form of abscess-formation that has received very little attention, and is yet worthy of careful study and clinical consideration in cases of obscure symptoms.

Plastic Operations on the Bladder.– RUTKOWSKI (*Centralblatt für Chirurgie*, 1899, No. 16) reviews the various methods which have been employed in restoring the defects in the urinary bladder, either the result of operations demanding an extensive excision or in cases of congenital defect. He also reviews the results of implantation of the ureters into different portions of the intestine.

The method which he has devised and successfully employed he describes as follows in giving the details of a successful operation :

The intestine seems to offer the best substitute as material for the plastic formation of a new bladder wall, on account of the similarity of its structure. The abdomen was therefore opened above the ectopic defect and the ileum brought out. A portion about two inches in length was resected and the proximal and distal ends of the gut united by a circular enterorrhaphy. The portion resected was then divided longitudinally opposite to the mesenteric attachment, and thus formed a rectangular flap, which was brought down and sewed into the defect in the bladder by a series of deep catgut sutures that did not include the mucous membrane, and a superficial or external Lembert suture. The abdominal wound was then closed and drainage of the bladder established by a permanent catheter. The resulting union was all that could be desired. The abdominal stitches were removed on the tenth day. A compress was arranged so that it pressed the urethra against the pubic bone, permitting the patient to retain his urine for three-quarters of an hour. Eight weeks after the operation the patient could retain 25 c.cm. of urine while the stream had sufficient force to carry it a foot.

Localization of Bullets by X-Rays.—LUCAS (*British Medical Journal*, October 21, 1899) reports two cases in which bullets from a revolver were located by means of the X-rays with such precision that not only the bullet, but in one case its fragments and fragments of the bone carried with it were removed from the brain. The child in this instance was very much shocked at first, but recovered slightly. She was restless and irritable, and vomited every time any fluid was given her to drink. This continued three days, and made rectal feeding necessary. No paralysis or drainage to motor centres was indicated. The skiagraph showed that the bullet had been divided, and one portion had gone up to the apex. It was successfully removed with the skiagraph as a guide. The immediate effect of the operation was most marked. Previous to it she had vomited everything and was rapidly emaciating, but from the time the bullet was removed the vomiting entirely ceased, the child took her milk with relish, and soon began to ask for more food. She recovered completely with no paralysis.

In the second case the bullet entered the neck, passed behind the vessels and nerves, and embedded itself on the second cervical vertebra. From this position, shown in the skiagraph, it was readily removed.

The Immediate and Remote Results of Surgical Intervention in Calculous Cholecystitis.—LEJARS (*Rev. de Chir.*, November, 1899) reviewed his results in twenty cases of operation upon the biliary passages of calculous cholecystitis.

Two operations were performed for infective cholecystitis the result of infection with the bacillus coli, which had supervened in cases of chronic cholelithiasis. In one case the operation was without avail, and the patient died from infection; in the other the opening of the gall-bladder was followed by an immediate fall in temperature and progressive recovery. Drainage is the only rational treatment in these acute cases.

The same is true in cases of empyema of the gall-bladder. The greatly distended bladder in one case was opened posteriorly, the drainage, however, sufficed to secure complete recovery.

There are two principal groups of the chronic variety: those where pain is present and where it is absent. The diagnosis is easy in the first group. In the second the differentiation has to be made from cancerous disease. Exploratory laparotomy is always advisable, even though a cancerous condition is found that is inoperable; a cholecystostomy often affords the patient great relief.

In cases where calculi are present there are three principal forms. 1. A large bladder; clear fluid; solitary calculus impacted in the neck of the bladder or in the cystic duct. These cases belonged to this class. In one the calculus was not found at the operation, but was discharged spontaneously into the dressings three weeks later.

2. The second class: the bladder is filled with a great number of calculi varying in form and size, sometimes hundreds in number. In the twelve cases of this character he performed cholecystectomy in three cases and cholecystotomy in the remainder. Of these cases two died immediately, one from complicating cancer, the other from cachexia. Seven recovered completely, the fistulæ closing after, in some cases, eliminating calculi that had not been found. They all have remained free from calculi for periods varying from eighteen months to four years after the operation. One died two years after the operation from phlegmonous ulceration that apparently originated in the bladder wall. The drainage resulting from the fistula is of great value in all these cases in its effect upon infection of the gall tracts. The three cholecystectomies are all well five years after the operations.

3. Where the gall-bladder is retracted, thickened, and contains one large or a few small calculi, cholecystostomy followed by drainage has proved as effectual as in other cases, relieving marked cachectic symptoms and ameliorating the unbearable pain. Operation is, therefore valuable in all these forms of calculous cholecystitis.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,

OF PHILADELPHIA,

AND

THOMPSON S. WESTCOTT, M.D.,

OF PHILADELPHIA.

Hospital Contagion of Typhoid Fever.—GUINON (*Revue Mensuelle des Maladies de l'Enfance*, December, 1899, p. 553) has already called attention (*Ibid*, January, 1898, p. 32) to the possibility of typhoid fever infection in hospitals, and reported three instances among children. This danger which, in his opinion, is more frequent than is generally supposed, has been confirmed by later observations of Bourcy, Netter, Troisier, and others (*Société médicale des Hôpitaux*, 1897). The three cases reported by Guinon occurred in a boys' ward of the Hôpital des Enfants-Malades, which was temporarily overcrowded by the closing of another ward. Three new observations are now reported from the same hospital, occurring in a girls' ward in perfect sanitary condition, which had not been overcrowded except for about two weeks in August.

1. A girl, aged eleven years, admitted August 25, 1899, for vomiting, with diarrhœa. The diagnosis of mild apyretic gastro-enteritis was made. On September 4th she was discharged convalescent, after a sojourn of ten days in the hospital. On September 20th she returned with typhoid fever of six days' duration. The disease had, therefore, begun about the 15th of September, twenty-one days after her first admission to the hospital, and eleven days after her discharge. The author considered that the child had been infected in the hospital.

2. A girl, aged ten and one-half years, was admitted August 16, 1899, for simple apyretic icterus, from which she rapidly recovered. She was discharged September 4th. She had, therefore, spent nineteen days in the hospital. On September 12th she returned with typhoid fever of four days' duration. The disease had, therefore, begun on the 8th of September, or twenty-two days after admission to the hospital, and only four days after her discharge.

3. A girl, aged fourteen and one-half years, was admitted May 13th for bronchitis, perhaps tuberculous; she remained until July 17th, more than two months, when she was discharged and developed the first symptoms of typhoid fever twenty-two days later.

As to this last case the author admits that some difference of opinion may exist. If it is held that the period of incubation does not exceed three weeks, the child could have become infected just after leaving the hospital. If, however, the incubation may last a longer time, as he personally believes, the case must be considered one of hospital infection. The method of infection is not explained. The possible influence of drinking water was excluded in the second and third cases, which are stated not to have drunk water and to have been confined to bed during their sojourn in the hospital. A fatal case of typhoid fever had occurred in the boys' ward during this same period of service.

[Other possible avenues of infection, such as the milk, for instance, seem to have received little consideration in seeking for the source of the disease in these cases. —Ed.]

The Geographical Tongue in Childhood.—H. Böhm (*Sammlung klinischer Vorträge*, 1899, No. 249) presents a résumé of a number of personal observations and a very complete review of the literature upon this interesting condition. The following conclusions are drawn: The so-called geographical tongue is a relatively frequent affection during the first two years of life. In the great majority of cases it appears soon after birth, sometimes in the course of the first year, rarely later. The lesion may persist for years, disappearing for some time, and again reappearing.

The most important conclusion of the study is that in two-thirds of the cases observed by the author there existed manifest signs of scrofulosis or even tuberculosis, in some instances with, in others without, hereditary antecedents. While this fact is very suggestive, the author thinks that further observations are needed to establish a distinct relationship between geographical tongue and tuberculosis.

In several of the cases observed the affection disappeared in later childhood after lasting several years, alternatingly disappearing and reappearing.

This condition, which is essentially a catarrhal glossitis, behaves very much as the chronic catarrhs which are observed upon other mucous surfaces of the scrofulous.

In the cases collected the author found five which had died while under observation. Only one of these showed tuberculous lesions. While this seems to be opposed to the view advanced by the author, it really only serves to confirm the general rule that tuberculous lesions in the scrofulous are rare.

The Relation Between Nocturnal Enuresis and Adenoid Vegetations.—A. Grönbech (*Ugeskrift f. Läger*, 1899, in *Revue Mensuelle des Maladies de l'Enfance*, December, 1899) calls attention anew to the probable existence of a relation of cause and effect between the embarrassment of respiration caused by adenoid vegetations and the occurrence of nocturnal enuresis. Out of 427 cases of adenoids, 61, or 14.3 per cent., were among children affected with incontinence of urine. In four of these cases there was simply a coincidence, since the enuresis spontaneously ceased without the slightest change in the condition of the nasopharynx. Thirteen cases were not operated upon or were lost sight of very soon after operation, and five times the removal of the vegetations was without effect upon the incontinence. Of the remaining 39 cases the extirpation of the adenoids was followed in 26 by disappearance, and in 11 by improvement of the incontinence; and in the remaining 2 cases a spontaneous cure of the nasal obstruction was followed by complete relief of the enuresis.

Therefore in 9.1 per cent. of the cases of adenoid vegetations observed by the author there existed a clearly established relation between the pharyngeal growth and an incontinence of urine. Another fact in favor of Grönbech's theory is that the frequency of incontinence of urine among children in general appears to be much less than this figure.

The mechanism of incontinence of urine in these cases has been very satisfactorily explained by an American observer, HUBER (*Archives of Pediatrics*, April, 1899, p. 260). Adenoids, he says, with or without associated nasopharyngeal catarrh, cause mouth breathing. The thirst in a measure is due to the parched state of the mouth and tongue; the child, frequently neurotic, yields to its desires, and to satisfy its thirst drinks more or less at frequent intervals. The result is evident in the large amount of urine secreted and passed. The true explanation is found in the changes in the blood and lymph circulation in the brain induced by the lesion in the nose. In consequence of these changes the blood is surcharged with carbonic dioxide or there is a deficiency in the amount of oxygen; the cerebral circulation is interfered with, and finally many products of cerebral tissue-metabolism accumulate in the brain to produce the symptom-complex to which the term "aprosexia" has been applied. Such children are dull, stupid and backward, lacking in general innervation. They do not pay attention to their wants, and as the higher inhibitory centres are less acute, the bladder reflex is not respected, and incontinence follows.

Saccharine Diabetes in an Infant.—LE GENDRE (*Société de Pédiatrie de Paris*, November 14, 1899) reports a case of diabetes mellitus observed in an infant, aged twenty-two months, which was brought to him on account of increasing emaciation without loss of appetite or digestive trouble. There was no organic lesion found, except perhaps a slight increase in the size of the liver. During the examination the child became agitated and fretful, and the nurse gave it a glass of water, which she stated was the only thing that would quiet it. The baby drank so greedily that the idea of diabetes was at once suggested. It was then found that in the twenty-four hours 750 grammes of urine were secreted, which contained 13.87 grammes of sugar.

Despite the substitution of a nitrogenous diet for a farinaceous one, and despite the usual treatment, the glycosuria increased, emaciation progressed, acetone appeared in the urine, and five weeks after the first recognition of the disease the child died in coma.

The interesting point in the observation is the absence of any cause except a bad family history in both parents. The paternal grandfather was gouty, the grandmother suffered from biliary lithiasis, and the father had been gouty from the age of twenty-eight years; the mother was a nervous arthritic, the maternal grandfather diabetic and cirrhotic, and the grandmother also the subject of biliary lithiasis. An elder brother, born before the appearance of gout in the father, was in good health. The little patient, however, had been procreated at a time when the father was scarcely convalescent from a gouty nephritis and the mother was recovering from some gynecological affection which had required curettement. The child was born at term and was well formed. He had walked and talked at the usual age, and had had no illness but an influenza with double otitis. The diabetes, the author thinks, can be attributed only to the double heredity and to the very peculiar circumstances of procreation.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,
PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Treatment of the Plague.—MR. JAMES CANTLIE states that Haffkine's vaccine has been carefully tested, and tens of thousands of persons have been inoculated with it. The dose for prophylactic purposes is from one-half to three-quarters of a drachm. The symptoms which result from the inoculation are headache, nausea, lassitude, fever amounting to about 101° F., and swelling and pain at the inoculated part. All these effects pass off in a couple of days. By this injection the case-mortality has been reduced one-half and a really valuable agency has been added to our armamentarium. The length of time the inoculation renders a person immune has not yet been ascertained, but this is known, that the inoculated individual is practically safe while the epidemic is raging, viz., from four to seven months. Segregation, isolation, and disinfection are the means adopted when this disease breaks out in a community. In medicinal treatment symptoms must be the guide. Initial constipation with slight icterus calls for five grains of calomel, but in the intestinal type of the disease free purgation is not devoid of danger. The buboes may be poulticed, chiefly with the idea of relieving pain. The substance of the gland may be injected with a minim or two of carbolic acid, solutions of mercuric chloride, or potassium iodide, or surgical measures adopted. None of these modes of treatment has yielded such measure of success as to recommend themselves highly. To combat the tendency to heart failure the usual drugs are indicated : digitalis, strophanthus, musk, camphor, ammonium carbonate, and alcohol. High temperature is to be treated by phenacetin in preference to either acetanilid or antipyrin. Delirium is to be relieved by sponging the body with warm water, cold applications to the head, and hyoscine, one one-hundreth of a grain, given hypodermatically. The curative serum of Yersin has met with but little success in China and India, but in Oporto it reduced the mortality to *nil.*—*The Practitioner*, 1899, vol. lxiii., p. 522.

Ten Years of Typhoid Fever at Roosevelt Hospital.—DR. W. H. THOMSON recommends five grains of calomel and twenty-five of compound jalap powder if the patient is admitted before the end of the second week. This purge is repeated every third night until the close of the second week. Diarrhœa is not a contraindication, it being checked altogether in the majority of cases, and the character of the movements is improved. Apparently the temperature is lowered, the tongue grows moist. A mercurial cathartic acts as an effective gastro-intestinal antiseptic and lessens toxæmia. The purge may be continued in the third week, stopping it when there is danger of intestinal hemorrhage. Equal parts of milk and lime-water form the exclusive diet until the fourth week. Dilution of the milk is requisite—the stomach often rebels against milk of full strength, when given continuously. Lime-water as a diluent is advised for its decided antiseptic properties. Farinaceous gruels, preferably arrow-root, are added in the fourth week. Typhoid fever markedly reduces the normal gastric secretions; digestive efficiency is greatly diminished. Pepsin is therefore given at three-hour intervals, ten grains, throughout the fever, and with it ten grains of bismuth subcarbonate. Either drug or both may be increased to twenty grains, as occasion demands. Bismuth is the most serviceable intestinal antiseptic. Dry tongue, stomatitis, pharyngitis, parotitis, otitis, and diarrhœa are notable by their absence. Emaciation is prevented in large measure. On the advent of dry tongue ten to twenty minims of spirit of turpentine are given in emulsion every four hours. Circulatory weakness is treated with alcoholic and other cardiac stimulants, except digitalis. Intestinal hemorrhage is checked by silver nitrate, one-fourth of a grain; opium, one-fourth of a grain; resin of turpentine, nine grains, made into three pills, and one given every two to four hours. Five minims of solution of potash added to each pill aids in their intestinal dissolution. General toxæmia requires the cold bath. Every three hours, if the temperature is 103° F. or over, a full bath is given, with active friction of the whole body. Bath temperature varies from 60° to 80° F., depending on the effect on the body temperature and reaction of the patient. To lessen subsequent shivering one drachm of Hoffmann's anodyne in camphor water is given. It may also be administered before the bath to asthenic patients. Artificial Nauheim salts and carbonic acid added to the bath undoubtedly lessen the period of depression following the bath, and antipyresis is prolonged, probably through the general cutaneous stimulation of the salts and acid. A pound of sodium carbonate added to the bath increases the effect of the Nauheim salts. When albuminuria appears rectal irrigations of decinormal saline solution, four to six gallons, administered by Kemp's rectal irrigator, several times daily are recommended. This measure is also advised in all cases of fever with severe toxic symptoms, increased renal elimination resulting.—*New York Medical Record,* 1899, No. 1514, p. 694.

[The statement is made that the cold bath doubles the uro-toxic coefficient. Inasmuch as at present there is no reasonably accurate method of determining this all such claims are impossible of proof or disproof.—R. W. W.]

Carbolic Acid.—DOTT. GUIDO BACCELLI for more than ten years has employed this substance in ½ per cent. aqueous solution in the treatment of various neuralgias, even the more resistant, as sciatica. When studying the mechanism of its action he found that it diminished the reflexes of the central nervous system and lowered the temperature. On account of the former he believed that it would prove to be useful in tetanus, and of forty patients treated in this way but one died. The details to be observed are: Subcutaneous administration in dose of from one-third to two-thirds of a grain every two or three hours until a daily amount of from six to twelve grains is reached. Not only do better results recommend its use, but it is more convenient, practical, and economical than antitoxin. Further, it assures antisepsis and local disinfection. Sero-therapy is effective only as a prophylactic and when used at the moment when the toxin is produced.—*La Riforma Medica*, 1899, vol. iii., p. 315.

DOTT. G. PINNA reports a single instance of cured traumatic tetanus by this method. In commenting upon this he cites the statistics compiled by Ascoli, which are as follows: One death and thirty-two recoveries, the above method having been employed. Eleven deaths, thirty-six cured by the serum of Tizzoni; thirteen deaths and twenty recoveries with Behring's serum.—*Il Policlinico*, 1899, No. 17, p. 427.

Intestinal Antiseptics.—DR. I. BURNEY YEO: The design and scope of such antiseptics are to control or prevent the development and antagonize the absorption of poisonous substances in the intestinal canal; in short, to prevent intestinal auto-intoxication. Morbid fermentation occurring in gastric dilatation is arrested by this class of drugs. In duodenal indigestion, when excessive fermentation occurs, causing pain and distention after taking food, and sometimes even catarrhal jaundice, intestinal antiseptics as thymol or menthol with rhubarb or calomel at short intervals are serviceable. Morbid conditions in general, depending on abnormal decomposition within the alimentary canal, require this class of drugs. In muco-membranous colitis they are useful. Benzoates, salicylates, and naphtol, fifteen grains in all, twice daily, are harmless and efficacious. There follows rapid deodorization of the solid and gaseous discharges from the bowel. Summer and infective diarrhœas in children due to acute gastro-enteritis depending on morbid bacterial activity are greatly benefited by intestinal antisepsis. Systematic intestinal irrigation is a valuable adjunct. Such remote affections as arrhythmia with dyspnœa, severe chest pain, vertigo, may be due to intestinal auto-intoxication, and are to be treated accordingly. The large amount of aromatic sulphates excreted in the urine of patients suffering from pernicious anæmia suggests that there is excessive intestinal decomposition. A hæmolytic poison is thus generated; intestinal antiseptics are thus indicated as the rational treatment. Chlorosis is benefited by purgatives, their antiseptic action is serviceable. A recent suggestion is that uræmia may be due to toxic matters formed in the intestine, absorbed by the blood, and inability of the kidneys to excrete them. Purges and milk diet are recognized as valuable in this condition. Cholera is often treated by intestinal antisepsis. The treatment of dysentery by evacuants and antiseptics is gaining in favor. Typhoid fever likewise is antiseptically treated by many. Boiled water, frequently given in small quantities, twice an hour, dilutes toxic matters, washes away débris of decomposing food, dissolves toxins attached to formed elements, and increases blood pressure (Grancher). A moderate dose of calomel early in typhoid fever is advised, to be twice repeated during the first ten days. Bismuth is valuable also as an antiseptic, and by coating the mucous membrane (large doses) hinders absorption of toxins. A chlorine mixture is preferred to all others; its composition is not stated. The text-book statement of the decomposition of salol is doubtful. Salicylic acid disinfects the urine. It is found therein. A combination of eucalyptol, creosote, and turpentine mixed with a powder (cinnamon) and made into a paste with honey, and enclosed in capsules, is not absorbed in the stomach, and passes intact to the intestines.

Dr. Vaughan Harley and Dr. Francis Goodbody conclude from experiment that high irrigation diminishes intestinal putrefaction. Large doses of calomel are followed by much bile in the intestine; in addition to its cholagogue action calomel checks the conversion of bilirubin into urobilin. Conclusions drawn are: 1. Estimation of the amount of aromatic sulphates daily eliminated in the urine gives a fair idea of the amount of intestinal putrefaction, provided aromatic substances are not being administered. 2. Rectal irrigation decreases the aromatic sulphates in the urine, and hence diminishes intestinal putrefaction. 3. A mild aperient is an intestinal antiseptic, decreasing the amount of aromatic sulphates in the urine. 4. Calomel does not, given in small doses, diminish aromatic sulphates in the urine sufficiently to consider it an intestinal antiseptic, when these sulphates primarily are small. But when there is an increase in intestinal putrefaction small doses do act as an intestinal antiseptic.—*The British Medical Journal*, 1899, No. 2027, p. 1200.

Urotropin in Posterior Urethritis.—Mr. Gerald Dalton reports five instances showing most decided and marked benefit which must be referred to this remedy alone. The local and other treatments improved matters up to a certain point, and then apparently became useless, a state of affairs unfortunately only too common in the cure of these troublesome complaints. In two other instances doubtful relief was obtained, due, however, in both to the patient's neglect of treatment and lack of abstinence from alcohol. While in several other patients, now under observation, a complete cure has not yet resulted, in no case can a complete failure be recorded. The amount employed was from seven to ten grains thrice daily. There was entire disappearance of symptoms in from nine to twelve days. The remedy is best administered well diluted in carbonated water.—*The Therapist*, 1899, vol. ix. p. 259.

Strophanthus.—Dott. A. Pisani reports that this remedy really increases arterial blood-pressure, and this increase is exclusively due to its cardiotonic action. The increase appears in from a few minutes to some hours. At the same time the pulse-rate diminishes from five to twenty beats each minute, and the sphygmographic tracing, while retaining its general characteristics, is amplified and regulated as to its rhythm. It is concluded that strophanthus acts upon the myocardium without influencing the vasomotor system, and is especially indicated for atonic myocarditis and myocarditis of slight or moderate intensity, so long as the greater portions of the muscular fibres remain capable of stimulation.—*Gazzetta degli Ospedali e delle Cliniche*, 1899, No. 109, p. 1156.

Treatment of Melæna Neonatorum.—Dr. Albert Gutmann reports that a child, thirty-six hours after birth, passed about eight ounces of blood by the bowel. Three sheets of commercial gelatin were dissolved in eight ounces of water, boiled for a few minutes, and, after cooling, one-half given per os, the remainder by enema. So soon as the enema was expelled some blood, which was doubtless in the bowel, followed. After this there was no further hemorrhage. The prompt action and harmlessness of this remedy suggests its employment for similar conditions.—*Therapeutische Monatshefte*, 1899, Heft 10, S. 552.

Diabetes Mellitus.—Dr. J. M. Allen calls attention to the great prevalence of chronic inflammation and ulceration of the duodenum preceding diabetes. These conditions in the duodenum affect the secretions of its glands; the metabolism of starch to glycogen is hindered, and glucose remains in such large quantities that it is excreted by the kidneys; or peripheral irritation, by reflex action, affects the nutrition of the nerve-centre presiding over the conversion of starch to sugar (located near the duodenum). This reflex irritation, if continued, produces structural changes in tissue. Treatment based on this latter view is as follows: Permit only such food as the stomach will digest, giving the duodenum rest, and thus preventing physiological hyperæmia. Thus is removed one source of irritation (hyperæmia) to the inflamed duodenum. Intestinal germicides, as creosote, zinc or soda, sulphocarbolates and others, are indicated. Hydrastis and salol together are recommended as stimulant and alterative to the mucous membrane. To control reflex irritation one-fifteenth to one-tenth grain of morphine three times daily, or aqua chloroformi, is useful. Anæmia of the nerve centres is usually present and requires strychnine (nitrate), one-fortieth to one-sixtieth grain thrice daily. Iron preparations and cod-liver oil are to be avoided among the tonics; bitters or phosphate of lime or soda are preferable. Hyperacidity and hypersecretion due to reflex irritation originating in the duodenum is often present, and keeps the chyme acid after its reception into the duodenum. Accompanying this condition is an increase in glycosuria. Potassium bicarbonate, twenty grains, largely diluted, after eating, diminishes acidity. Following its exhibition is a decrease in the glycosuria and amount of urine. Creosote, one-third of a drop; tincture of nux vomica, ten drops; saw palmetto, one drachm, given together, are recommended as a tonic and mucous membrane stimulant. Retrograde tissue metamorphosis is thus lessened. Hygienic surroundings, baths, and massage, with no mental or physical work, are necessary adjuncts in treatment. Several patients were apparently cured by the above treatment. Many were benefited, there being a decrease in quantity of sugar and amount of urine.—*Journal of American Medical Association*, 1899, No. 18, p. 1070.

Headaches and their Treatment.—Dr. T. Lauder Brunton discusses their etiology and groups the methods of treatment accordingly. Supply the brain with healthy blood and remove toxins absorbed from the intestines by means of "blue pill" and "black draught." Salicylic acid and its salts are powerful cholagogues, and are best given with potassium bromide, twenty or thirty grains of each; they act better together than either drug alone. When the headache is violent and often repeated, salicylates are indicated in small doses three times daily. Depression and weakness resulting are avoided by adding half a drachm of aromatic spirit of ammonium. Drugs of the salicylic acid class when taken long tend to cause anæmia, and a little iron should be added. Drugs like antipyrin should be given before the headache becomes too severe, for when it is severe absorption from the stomach is arrested. Often a first dose acts admirably, while later ones are inert. By these drugs pain is dispersed throughout the cord, and does not reach the brain centres for pain. Sometimes in intense headache the pain is increased by these drugs, it being disseminated through the various pain channels, and thus succeeding in reaching the brain. Caffein is useful, acting more on the posterior columns of the cord. Subcutaneous morphine injections temporarily relieve, but should be avoided because of the danger of the opium-habit. Protracted pain in the head will sometimes yield to cannabis indica, other drugs failing. The tincture is preferable, ten minims thrice daily. Headache caused by periosteal inflammation due to gouty, rheumatic, or syphilitic irritation, is best treated with potassium iodide in small doses, gradually increased. Migraine is probably caused by a contraction of some of the bloodvessels, with dilatation of others; accompanying this is the stretching of various nerve fibres within the vessels. Pressure on the carotid artery of the affected side relieves the strain, and immediately lessens the pain. Non-nitrogenous diet appears to lessen the rate at which deleterious matters accumulate in the blood in patients suffering from headache due to disordered nutrition, thus increasing the intervals, and finally no headache occurs. Errors in refraction and accommodation should be corrected. Caries of the teeth often is a cause of headache. Obstruction of the pharyngeal end of the Eustachian canal and of the various sinuses of the head should be treated. Where intraocular tension is increased and continues between the attacks of headache, glycosuria may be the cause.

Dr. J. W. Tyson: Headaches associated with high arterial tension respond well to combinations of gelsemium with sodium salicylate.

Dr. S. T. Mullick strongly recommends galvanism in neurasthenic headache.—*British Medical Journal*, 1899, No. 2027, p. 1241.

Dr. A. Haig divides headaches into: 1. Temporary. 2. Chronic. 3. Paroxysmal or recurrent. Temporary headache is usually due to alteration of pressure inside the skull or in the membranes. As these pass away so does the pain; an ice-bag is often serviceable. Chronic headache is due chiefly to new growths on the skull or membranes, or within them, and to neuralgia, which is often another name for inflammation and pressure about the teeth. New growths must be treated either surgically, or if specific, with antisyphilitic remedies. The neuralgic form requires that the teeth be cared for; quinine also may be serviceable, together with purges, lowering blood-pressure. Paroxysmal headache is due to fluctuations in the excretion of uric acid, which is stored in excess in the blood. Treatment consists in avoiding food or drink containing uric acid or xanthin—*i. e.*, no animal foods except milk and cheese; vegetable substances rich in alkaloids (as tea and coffee) are barred; in not taking more nitrogenous food than physiology requires —*i. e.*, enough albumin to produce three to three and one-half grains of urea for each pound of body-weight, but no more; in clearing out uric acid accumulations in the body—this is usually accomplished by the change in diet, but occasionally salicylates are required to aid in elimination. Following these changes in living there is a distinct diminution both in frequency and severity of headaches in a few weeks, occurring one-tenth as often after a year, with corresponding decrease in severity. Resumption of uric acid ingestion is followed by return of the headaches. As the headaches improve, quickening of capillary circulation and fall of blood-pressure throughout the body follow.—*The British Medical Journal*, 1899, No. 2027, p. 1246.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Abdominal Hysterectomy for Cancer of the Uterus.—PICQUE and MANCLAIRE (*Annales de Gyn. et d'Obstétrique,* June, 1899) believe that simple vaginal hysterectomy is not the most radical method of dealing with cancer of the uterus. In order to remove all the disease the operation must not only be undertaken as early as possible, but must be thorough, involving the removal of all the affected lymph-glands. This can be accomplished only by the abdominal route. The procedure is lengthy and not free from danger, on account of the proximity of large vessels. Preliminary ligation of the uterine arteries at their point of origin affords the best method of hæmostasis. The operative mortality in the abdominal operation is four times as great as in vaginal hysterectomy.

As regards the ultimate results, sufficient data have not yet been collected to speak positively. Moreover, the technique has not been perfected. It must be remembered that the thorough removal of carcinoma foci from the pelvis is a far different procedure from the dissection of the axilla or the neck, but if the more dangerous operation increases the chances of the radical cure, the surgeon should not hesitate to perform it in every suitable case of uterine cancer.

Occlusion of the Tubes by Ligature.—FRAENKEL (*Archiv für Gynäkologie,* Band lviii., Heft 2), as the result of experiments on animals and observations on the human subject, concludes that after simple ligation of the Fallopian tube the lumen may again become patent, so as to allow the escape of fluids into the peritoneal cavity or the passage of ova and spermatozoa. The only way to insure permanent occlusion is either to suture the mucosa and muscular layer separately, and to cover the stump with peritoneum, or else to excise the entire tube at its origin from the uterine cornu. The latter procedure alone secures the patient against the chance of subsequent conception in cases in which this result is desirable.

Inversion of the Uterus by Neoplasms.—ALEXANDER (*Archiv für Gynäkologie,* Band lviii., Heft 2) mentions the following conditions under which this may occur:

1. Inversion may take place in an atrophic uterus, in which the muscular tissue has lost its elasticity and power of contraction, purely from the weight of the tumor, assisted by intra-abdominal pressure. 2. It may occur in a healthy organ, in which the cervical canal has become dilated by retraction of the cervix above the lower portion of the growth, with accompanying loss of tone of the uterine wall at its base. 3. In a normal uterus inversion may

take place without dilatation of the cervix and partial extrusion of the tumor in consequence of atony of the muscular wall at its base.

Cancer of the Urethra in the Female.—EHRENDORFER (*Archiv für Gynäkologie*, Band lviii., Heft 3) concludes, from a critical study of this subject, that cancer of the urethra is a rare affection. The glandular variety is found in the urethral canal, while the epithelial form originates at the meatus and its neighborhood. The latter, which the writer terms vulvo-urethral, extends early to the urethra, and does not invade the surrounding parts so widely as epithelioma developing in the vestibular region. It is possible to make these distinctions only in the incipient stage of the disease. Whether different lymph-glands are affected in the urethral and periurethral malignant disease has not been definitely established.

Plastic Operations versus Shortening of the Round Ligaments in Prolapsus.—STAEDLER (*Archiv f. Gynäkologie*, Band lviii., Heft 3) thinks that it is unscientific to endeavor to cure prolapsus by amputating the cervix uteri and performing anterior and posterior colporrhaphy. Removal of the cervix not only does not reduce the size of the uterus, but may result in a serious complication should the patient subsequently become pregnant. Removal of mucous membrane and fibro-muscular tissue from the vaginal walls destroys their natural elasticity, and the cicatrices which remain become overstretched during labor, so that the condition is the same as before operation. Shortening of the round ligaments, combined with Tait's method of perineorrhaphy, meets all the indications more satisfactorily, especially in women at the child-bearing age.

Metabolism After Removal of the Ovaries.—FALK (*Archiv f. Gynäkologie*, Band lviii., Heft 3), from experiments on dogs, finds no support for the theory that castration influences the excretion of phosphates, as held by Curitulo and Tarulli. He believes that further investigations are necessary before the question of the so-called internal secretion of the ovaries can be settled.

Angiotripsy.—The universal interest felt in Doyen's method of controlling hemorrhage by the angiotribe, instead of by permanent clamps and ligatures, is shown by the number of improvements of his original instrument which have been suggested, no less than three being described in the *Centralblatt für Gynäkologie*, 1899, No. 37.

In the same journal VAN ROSSEM details a series of experiments with Hoeffteke's modification of the angiotribe. In these the femoral arteries of rabbits were isolated and clamped for two or three minutes, no bleeding following its removal. In several instances the aorta was compressed for five minutes. After relaxing the pressure there was no hemorrhage, while the heart continued to beat vigorously. Subsequent microscopical examinations showed that the lumen of the aorta was entirely obliterated, the opposed endothelial layers being adherent, while the vessel wall was uninjured. The tissues preserved their normal appearance, while on either side of the compressed area were large lymph-spaces containing the lymph which had been forced out by the pressure. In none of the specimens was there any injury to the wall of the vessel.

The writer infers that the longer the pressure is maintained the less is the danger of hemorrhage. The results are better when the vessels are not isolated, but are compressed with the surrounding tissues. With the greater perfection of the instrument it is probable that the hæmostasis will be still more perfect.

Adenomyoma of the Uterus and Tubes.—NEUMANN (*Archiv f. Gynäkologie*, Band lviii., Heft 3) concludes that the intramural and subserous portions of adenomyomata of the uterus and tubes are probably derived from the embryonic remains of the Wolffian body and Müller's ducts. Adenomyomatous polypi of the uterine cavity develop from the former, while tubal growths spring from the parovarium. The abnormal glands and cysts found in the ovary develop from the primitive kidney.

Salipyrin in Gynecology.—BEUTTNER (*Centralblatt für Gynäkologie*, 1899, No. 37) finds that this drug is indicated in all cases of menorrhagia and metrorrhagia, except those due to malignant disease, large uterine neoplasms and abortion. It is also useful in climacteric and post-partum hemorrhages, in threatening abortion, and in dysmenorrhœa. Various experiments were conducted on rabbits and frogs, with the view of determining the exact action of the drug, but no definite results were obtained.

Subperitoneal Hysterectomy.—JABOULAY (*Lyon Médicale*, 1899, No. 37) describes the following method: The usual median incision is carried as low as the symphysis, but without opening the peritoneum. The latter is then pushed upward at the side of the bladder until the broad ligament is reached, when the ureter and uterine artery will be seen, the latter being ligated. Lifting the peritoneum still higher, the anastomosis between the uterine and ovarian arteries is secured and the round ligament divided. The same procedure is followed on the opposite side. The bladder is separated from the uterus from below upward, and the cervix uteri is then freed from the vagina and drawn upward and forward. The tubes and ovaries are then detached, the peritoneal cavity opened, and the uterus removed. The small transverse opening in the peritoneum is sutured and the cavity of the wound is drained into the vagina.

The writer has employed this method with success in several cases, and believes that it greatly diminishes the risk of sepsis, and prevents hemorrhage during the operation as well as facilitates the removal of diseased and adherent adnexa.

A Common Form of Sterility.—In an elaborate paper on this subject concluded in *La Gynécologie*, August 15, 1899, LEFEVRE states that in three-fourths of the cases observed by him sterility could fairly be attributed to the following combination of pathological conditions: Endocervicitis, stenosis of the os externum, acute anteflexion and abnormal depth of the posterior vaginal fornix. In order that treatment may be successful it is necessary to correct all these abnormalities by curettement, incision of the cervix, straightening of the uterus, and "retrocervical" colporrhaphy.

Torsion of the Fallopian Tubes.—PRAEGER (*Archiv f. Gynäkologie*, Band lviii., Heft 3) collected twenty cases, to which he adds two which came under his own observation. He explains this relatively small number by the fact that the pedicle is rarely sufficiently long to allow it to become twisted. In order that this accident may occur it is also necessary that there should be a cyst or neoplasm of the tube confined to the distal portion, and that no adhesion should be present. Torsion is accordingly most common in connection with hydrosalpinx. As regards the immediate causes of torsion, these are the same as in the case of ovarian tumors. Hemorrhage into the tube and sac result, as in ovarian cysts; the blood may escape into the peritoneal cavity. Necrosis, infection, and peritonitis occur secondarily. The clinical symptoms, prognosis, and treatment are practically the same as in ovarian tumors.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Vaginal Cæsarean Section.—DÜHRSSEN (*Berliner klinische Wochenschrift*, 1899, No. 6) reports the case of a woman suffering from fatal cardiac lesion, who was pregnant, and in whom the cervix was undilated and the mouth of the womb closed. As it was feared that the mother would die before the child could be delivered, Dührssen performed vaginal Cæsarean section. The result was the delivery of a living child, followed by the speedy death of the mother. The operation consumed but twenty minutes, and the child was delivered in five minutes after the beginning of the operation.

Post-mortem examination showed that the patient perished from advanced mitral disease, accompanied by rapid dilatation of the ventricles. Dührssen considers this method of operating most advantageous when delivery must be very rapidly accomplished.

The Clinical Study of Puerperal Fever.—In Mermann's clinic PEISER has investigated a series of cases in which no vaginal douche nor intra-uterine douche was given either before or after labor. The number of cases was 2701. In so far as possible no vaginal examination was made, but pelvimetry, palpation, and auscultation were carefully practised. Most strict external antisepsis was carried out, and nurses and attendants were changed as seldom as possible to avoid confusion.

The practical conclusions from his cases, which include operative as well as normal births, are strikingly in favor of the treatment employed. The mortality was 0.55 of 1 per cent. from all causes. When these cases were analyzed it was found that none of them had been infected in the hospital, and of these only a small portion died of septic infection. The writer believes that stringent sepsis, omitting all interference with the genital organs, gives the best possible results.—*Archiv für Gynäkologie*, 1899, Band lviii., Heft 2.

A Comparison of the Results of Symphysiotomy and Cæsarean Section.—In the *Archiv für Gynäkologie*, 1899, Band lviii., Heft 2, ABEL gives the results of the Cæsarean operations and symphysiotomies in Zwiefel's clinic at Leipsic for seven years. Fifty-two Cæsarean operations were performed and twenty-five symphysiotomies.

In judging of the permanent results of symphysiotomy it is noticed that the slowest recoveries occur in those cases in which there is a decided disproportion between the size of the child and the pelvis. The symphysis was closed in some cases with catgut, in others with silk, and in others with wire, while no suture material was employed in some. It was found that cases treated without sutures did better than the others. Some motion remained in the joint after operation, but not enough to interfere with the patient's movements. The healing of the soft parts had a greater influence upon the recovery than union in the symphysis itself. None of these patients had the slightest inconvenience in walking or in working afterward. In most of them the pelvis was larger than before the operation.

The results of Cæsarean section were equally good. Hysterectomy was not performed, but the uterus was sutured and allowed to remain. In repeated Cæsarean sections it was sometimes unnecessary to open the peritoneal cavity because of adhesions between the uterus and the wall of the abdomen. Repeated Cæsarean sections were successful and followed by quicker recovery than the first.

As regards the children born by these operations, there was nothing in the mode of birth which affected the child. Many of them, however, were born of unmarried mothers, and having little care perished from lack of proper nutrition.

When the results of the two operations are compared, both are found equally good. Abel also raises the question as to whether the power of procreation should be removed in patients with highly contracted pelves upon whom an operation is necessary for the delivery of the child. Unless the patient requests this it should not be done, in view of the success attending repeated Cæsarean sections and symphysiotomies.

Pregnancy and Myoma of the Uterus.—In the *Centralblatt für Gynäkologie*, 1899, No. 34, CHROBAK reports a case in which he performed total extirpation of the uterus for pregnancy complicated by a myoma as large as a child's head. An attempt was made under anæsthesia to push the tumor up out of the pelvis, but this was followed by symptoms of peritonitis, and Cæsarean section and hysterectomy were at once performed. Mother and child made good recoveries. Schauta also reports two cases in which pregnancy was complicated by these tumors. In the first, operation was performed because the tumor grew rapidly and occasioned great suffering. In the second the myoma was in the cervix, and was an obstacle to birth.

Röntgen ray pictures were taken of both cases, and serve to illustrate the diagnosis of the position of the tumor. In each case the uterus was entirely removed, and the only difficulty experienced lay in the great blood-supply, which required careful control.

A Case of Congenital Diastasis of the Symphysis Pubis.—At a recent meeting of the Obstetrical Society of Vienna, SCHAUTA reported a very interesting and rare case: The patient had a separation of the symphysis pubis of 2 cm., which was congenital. The bladder, however, was normal, which is not common in these cases. When the symphysis is deficient the bladder is almost always only partly developed. The patient gave no history of illness or injury, and had borne one child in normal birth without complications. She made a good recovery from this labor, and had no difficulty in walking either before or after labor. She had never had pain in the region of the pubis. There was no evidence that caries had ever attacked this joint. On examination the separation could be plainly felt, and the ends of the symphysis seemed rounded. The pelvis was symmetrically contracted, although not excessively so. There were no signs of rickets.

In the discussion upon this remarkable case Ludwig recalled a patient who had placenta prævia and rupture of the uterus, with separation of the symphysis. The patient died in labor, and the ends of the joint were found separated 2 cm. It was thought at the time that this condition of the joint produced a pathological fixation of the uterus, which favored its rupture during labor. The deformity had existed in this patient for some time, although she had had no difficulty in walking, and gave no history of illness or injury. When the joint was carefully examined and the tissues were dissected a latent tubercular process was discovered in the joint. The joint surface had become a cheesy material enclosed in a fibrous sheath.

Braun recalled a traumatic separation of the pubis of from 2 to 2.5 cm. occurring during labor. The recovery of the patient was slow, and four or five months elapsed before she could walk readily, wearing a double bandage.

The Various Sorts of Streptococci and Their Action in Disease.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, Band ix., Heft 6, 1899, MENGE and KROENIG contribute a paper giving the results of very interesting researches upon this important subject. It is evident that while many bacteria have been isolated, we still lack positive information regarding the virulence of species and also the conditions which especially arouse these germs to fatal activity. The writers have found that there are different forms of streptococci which in shape, arrangement, and facility to take color resemble each other very much, but which in culture growth and in resisting power to the oxygen of the atmosphere show marked differences. These properties remain constant with the streptococci through repeated cultures, as well as in a single culture. When the resistance which these germs offer to the oxygen of the air is considered they may be divided into two classes: First are those anaërobic streptococci which behave uniformly under the usual conditions of their environment. The other class consists of those which take a different action under varying circumstances.

The susceptibility of the first class of streptococci is very great. They flourish in liquid and in constant media only when present in large masses, which make sure the condition of anaërobiosis. Among these are those streptococci which when grown upon artificial material produce decomposition with offensive odor. These same germs are sometimes found as saprophytes in the vaginal secretion. In the first class are also those which as genuine parasites invade the human organism and show considerable vigor. Other germs of this class as parasites are found in human connective tissue in purulent peritonitis. At the point where these germs take their origin they are usually found divided into the two classes described. Later in their development symbiosis is present, and both sorts are found together. Both varieties of streptococci have been observed in the connective tissue of the human body in purulent parametritis, and in the local secretion from the uterus. In artificial culture media it is also possible to produce the phenomena of symbiosis.

A Case of Extreme Anæmia in Pregnancy.—SANITER reports, in the *Centralblatt für Gynäkologie*, 1899, No. 19, the case of a patient in the seventh month of pregnancy, who was taken, without apparent cause, with a rapidly progressing anæmia. In two weeks' time she had been greatly reduced in strength and had pronounced and serious symptoms. She was exceedingly hydræmic, the percentage of hæmoglobin was reduced to 30, the leucocytes were greatly increased, and the number of red cells were reduced to one-sixth of the usual quantity. Many abnormal forms of red cells were present. There was no enlargement of the spleen or of the lymphatic glands. There was also no evidence of impairment of the kidneys or of the heart. The patient passed from observation, so that the ultimate issue of the case could not be determined.

The Avenues of Septic Infection in the New-born.—An interesting monograph upon this subject by FISCHL, of Prague, was published by Breitkopf & Härtel, Leipsic, 1898, No. 220. The writer believes that septic infection may gain entrance to the fœtus through the placenta, the amniotic liquid, and the entire birth-canal before the birth. After the child is born the air of the room, the child's nourishment, the hands and instruments of those who care for it, its bath water and incubator may furnish contagion. For this reason it is best not to put the child into a bath until the umbilicus has healed. The mother's breast is usually an efficient filter for any germs which her milk contains, with the exception of a few, such as the diplococcus of pneumonia.

The most usual point of entrance for septic infection in infants is the umbilicus. Next after this come wounds of the skin received during birth, or some operation, as circumcision, eczema, syphilitic eruptions, and intertrigo. The conjunctiva is the mucous membrane most easily affected, while the nasal passages very rarely furnish a general and serious infection. The mouth, the respiratory tract, and the gastro-intestinal tract are often the starting-point for a general infection of serious nature. There is very frequently an absorption of toxins from these situations. It is rare for general infection to originate in infants in the genito-urinary organs.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

EDWARD JACKSON, A.M., M.D.,
EMERITUS PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC;
SURGEON TO WILLS EYE HOSPITAL, ETC.,

AND

T. B. SCHNEIDEMAN, A.M., M.D.,
PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC; ASSISTANT
SURGEON TO WILLS EYE HOSPITAL, ETC.

Pathological Relations of the Eyes and Teeth.—DR. LAGLEYZE (Buenos Ayres) has made an extended study of this subject, collating more than one hundred separate papers bearing upon it, which have been written within the present century. He concludes that there exist pathological relations between the teeth and the visual apparatus; but that some oculists have an exaggerated idea of the frequency of disturbances of vision due to dental disease. One should examine carefully the cavities immediately adjoining the orbit, and exclude diathetic and general conditions, and disease of other distant organs, before advising radical dental operations. Even if a dental lesion exists it may be only coincident; or a trigeminal neuralgia may be felt in both the eye and the teeth.

Dental lesions may give rise to reflex disturbances of the visual apparatus; or inflammations may extend from the teeth to the orbit by continuity of tissue. All the teeth, although very rarely the lower, are capable of causing ocular disturbances. Periostitis and caries of the alveolus, and disease of the first molars and the premolars of the upper jaw are most likely to cause ocular lesions.—*Archives d' Ophthalmol.*, May, 1899.

Treatment of Serpiginous Ulcer of the Cornea.—A. SCHULTZ (Berlin) employs the following: The eye is first thoroughly cleansed with a 1 : 5000 solution of corrosive sublimate. If the ulcer is small, the further treatment is by the instillation of atropine and of chlorine water, bathing with warm solutions of corrosive sublimate or of boric acid, and the application of a moist dressing. Atropine is used very freely at first, sometimes conjointly with scopolamine, to obtain the greatest mydriasis possible.

Chlorine water is used as an antiseptic collyrium in all forms of suppurative keratitis. The solution used should be perfectly fresh, because after long standing it loses its efficiency and becomes an irritant. It is usually instilled simultaneously with atropine, sometimes hourly. In large ulcers with much secretion iodoform is also used; but this is not equally tolerated by all patients. A pledget of cotton wet with a 1 : 5000 solution of corrosive sublimate is commonly laid on the eye, covered with a piece of rubber tissue, over this a layer of dry cotton, and then a bandage is applied. When corrosive sublimate is not well borne, boric acid may be substituted. About half of all the cases recover under this treatment. It is important to remove immediately any disease of the lachrymal sac if present.—*Arch. d' Ophthalmol.*, September, 1899.

Toothache from Insufficiency of the Internal Recti Muscles.—M. Neuschuler (Turin) reports the case of a medical student, otherwise healthy but with all the evidences of insufficiency of the internal recti muscles, who, on attempting to read, experienced a sense of heat and pain which gradually extended throughout the orbit, thence to the superior maxilla and through the teeth, becoming so painful that the reading had to be stopped. He was given correcting glasses for distance, and for reading, prisms of 2° with the base toward the nose were added. These enabled him to continue his ordinary work without any more trouble of the kind. Another case is cited in which the toothache occurred when playing the piano, and lenses with prisms of 4° base toward the nose gave complete relief. But the aching promptly recurred on attempting to play without the glasses.—*Recueil d'Ophthalmologie*, August, 1899.

[In both of these cases there seems to have been some error of refraction, which was also corrected, but which is not mentioned as a cause of the pain. While eye-strain through insufficiency of the interni may have the same effects, strain of the ciliary muscle through faults of focus is the more common condition.—Ed.]

Sarcoma of the Uveal Tract.—C. D. Marshall (London) reports upon fifty-eight cases, all seen at the Royal London Ophthalmic Hospital since 1891. In fifty-six cases the eye only was enucleated, and in two enucleation was followed in a few days by extirpation of the contents of the orbit. Of thirty-four of these cases known to be alive, eleven have lived from three to seven years without recurrence. Of twelve patients known to have died, six are known to have died of a recurrence of the disease. Marshall also carries on the history, so far as it could be learned, of the survivors of the one hundred and three cases reported by Lawford and Collins in 1891. Of these, six are known to be living without recurrence after periods of eight to seventeen years. Of the fifty-eight patients that are known to have died, thirty-four died of recurrent disease. In six cases the period of survival, before death from a recurrence of the growth, was from three to six years. Marshall points out that we should avoid drawing any arbitrary line, such as a three-years' limit, of recurrence.—*Royal London Ophthalmic Hospital Reports*, vol. xv., Part I.

[On these statistics, which are the best we have on the subject, one can safely base the opinion that early removal of intraocular sarcoma lengthens the patient's life, beside making it more comfortable. But, considering that the average age of these patients is fifty-five years, it cannot be held that any period of survival renders immunity from recurrence certain.—Ed.]

Diplo-bacillus Conjunctivitis.—J. W. Eyre (London) states that the diplo-bacillus of Morax and Axenfeld produces a lesion perfectly definite and distinct even as to its clinical aspect. There is a small quantity of whitish or grayish mucous-like discharge noticed in the corners of the eyes during the day, and slight gumming together of the lids in the morning. There is usually some irritation and smarting of the eyes and perhaps watering toward evening; and there may be slight photophobia and inability to continue close work long by artificial light. On examination small concretions of the discharge are found on the roots of the lashes, on the lid margins or at the inner canthus. The bulbar conjunctiva is but slightly injected; but the palpebral conjunctiva, particularly that lining the lower lid, is of a deep brick-red color; and the caruncle is of a deep red, in marked contrast with its normal pink color. Where the clinical characters of the case decidedly varied from those described, Eyre has found a mixed infection. Usually one eye is involved several days before the other. But both become affected, and the condition tends to persist even for several months.

The treatment preferred by Eyre consists in the use every two hours of a lotion containing:

Zinc ointment	4 parts.
Mercuric chloride	1 part.
Distilled water	4000 parts.

An ointment containing one grain of iodoform to an ounce of vaseline is also applied three times daily.—*Journal of Pathology and Bacteriology,* vol. vi. No. 1.

Argentamin for Conjunctivitis.—KARL HOOR (Klausenberg) finds that this organic salt of silver gives, in special forms of conjunctival catarrh and in the purulent conjunctivitis of the new-born or of adults, as good and as prompt results as those obtained with solutions of silver nitrate. In bactericidal power it is superior to the latter salt, and it penetrates more deeply into the tissues. It equally diminishes the hyperæmia and the swelling of the tissues, and limits the discharge. Five or 10 per cent. solutions cause little or no irritation. This he accounts for by their alkaline reaction in contrast with the acid reaction of the solution of the nitrate. The solution of argentamin to be effective must, however, be freshly prepared.—*Centralbl. für prakt. Augenheilk.*, August, 1899.

Bactericidal Action of the Tears.—E. VALUDE (Paris) has made an experimental and clinical study of the influence of the lachrymal secretion upon various pathogenic bacteria. He finds it a very poor culture medium for micro-organisms, and that it is capable of destroying the virulence of some of them, notably the bacillus of anthrax, the colon bacillus, and the yellow staphylococcus. Its influence upon the white staphylococcus was perceptible, but less marked. He also found that an acid reaction of the tears marked a predisposition to post-operative infection. In eighty cases of cataract tested prior to the operation of extraction, three showed an acid reaction of the lachrymal secretion, and in these three cases healing was complicated by iritis more or less violent, although no eye was lost.—*Annales d'Oculistique,* September, 1899.

[Valude's conclusions agree substantially with those of the majority of ophthalmologists who have studied the subject.—ED.]

Orbital Abscess of Dental Origin.—W. DAGILAISKI (Nijni Novgorod) reports the case of a boy in whom suppuration about the first upper molar tooth was followed by swelling of the corresponding cheek and eye. General symptoms of suppuration had supervened. The eyeball, exposed with difficulty on account of swellings of the lids, was found protruding, but with the cornea clear, normal reaction of the pupil to light, and vision equal to counting fingers at five metres. The carious tooth was removed, and an opening into the maxillary sinus gave vent to pus. Later an incision in the lip 3 cm. deep let out a quantity of foul-smelling, greenish pus. Improvement was rapid, and in four days vision had risen to eight-tenths. Cases are also cited illustrating the influence of dental disease in causing impaired vision, mydriasis, weakness of accommodation, phlyctenular conjunctivitis and glaucoma. In these latter conditions the fifth nerve might be the channel of morbid influence. But for the extension of suppurative infection, the continuity of the periosteum, the plexus of lymphatics and bloodvessels, and the cavity of the maxillary sinus offer special facilities.—*Klin. Monatsbl. f. Augenheilkunde*, July, 1899.

J. Guttman reports a very similar case, in which, however, there was more extensive damage within the orbit, and caries of its walls.—*Centralbl. für Augenheilk.*, October, 1899.

OTOLOGY.

UNDER THE CHARGE OF

CHARLES H. BURNETT, A.M., M.D.,

AURAL SURGEON, PRESBYTERIAN HOSPITAL, ETC., PHILADELPHIA.

Bacteriological-clinical Complications in Acute and Chronic Suppurations in the Middle Ear.—Ernst Leutert (*Archiv f. Ohrenh.*, July and September, 1899), after many long-continued observations and bacteriological cultures, concluded that in otitic brain abscesses the streptococcus is the chief causative factor. The staphylococcus has less influence, the other bacteria possess purely a subordinate place, and the pneumococci do not occur at all, as nearly all brain abscesses occur only in connection with chronic suppurations. A second statement made by Leutert is that the bacteria of a brain abscess are reduced in their vitality and hence in their virulence. This holds good not only for the pyogenic, but also for the septic bacteria. The bacterium coli and the proteus vulgaris found sometimes in pure culture from a brain abscess are not to be considered the original excitants of the abscess. The latter is caused by pyogenous cocci which, because of the reduction in their vitality, fail to grow in the culture medium, while other cocci like the above succeed in growing. This reduction in vitality of the pyogenic cocci under consideration may form the chief reason for the occurrence of a cerebral abscess. Korner has shown that otitic brain abscesses with few exceptions are found near the diseased parts of the temporal bone, and in most cases the passage-way from the diseased bone to the brain abscess can be traced. Therefore, the inflammation extends by continuity from the bone to the brain substance. It cannot be urged against this theory that sometimes the brain substance between the diseased bone and the abscess is apparently healthy, for these parts of the brain may heal if the disease in the petrous bone is lessened by better surgical drainage, while the abscess in the brain beyond continues unaltered. Again, this theory is not weakened by the fact that sometimes the abscess does not lie over the diseased bone, because the inflammation passing from the bone to the dura can wander a distance in the latter before it reaches the inner dural surface. Finally, at this point adhesion with the pia occurs and a circumscribed meningitis is set up by which the adjacent brain tissue is attacked. It is held to be unlikely, and it certainly has never been shown, that bacteria productive of an otitic brain abscess reach the brain tissue by way of the lymphatics from distant centres of infection. So far as the blood channel is concerned, either a brain abscess must originate directly by conveyance of the inflammation from a suppurating thrombus in a bloodvessel, or the infective organisms must reach their place of development as arterial embolisms after passage through the entire circulation.

Leutert maintains that it is the reduction in the virulence of the specific micro-organisms that effects the occurrence of a *circumscribed meningitis*, the preliminary condition of nearly all brain abscesses, whereas virulent bacteria, if they ever reach the inner surface of the dura, spread so rapidly over the leptomeninges that a diffuse meningitis is the speedy result. Hence a brain abscess is rarely found in connection with acute mastoid affections, though the latter affections are caused by more virulent bacteria. In such cases the meningitis is the direct result of the epidural suppuration. If, however, the virulence of the bacteria is nearly exhausted an affection of the brain substance from the circumscribed meningitis rarely occurs, and the latter can exist independently for a long time. "Therefore, in doubtful cases presenting symptoms of brain pressure in connection with acute suppuration, and after exclusion of a superficial epidural abscess, one must suspect the existence of a deep-seated epidural abscess rather than a brain abscess."

Leutert claims to have been the first to report the occurrence of the bacteria coli in a brain abscess. In several cases, notwithstanding the absence of septic bacteria, the odor of the pus was extremely fetid. He also reports that in all of his cases (four) of *perichondritis of the auricle* he succeeded in obtaining the bacillus pyocyaneus in pure culture. The perichondritis in each instance followed incision of the posterior wall of the auditory canal in the so-called radical operation on the mastoid. He thinks it would be well, therefore, in the after-treatment of cases in which a radical operation has been performed to bear in mind the possible presence of the bacillus pyocyaneus and take measures for its destruction. In *abscess of the auricle* the staphylococcus albus was found and was considered to be the causative factor.

Leutert shows that further experience substantiates his previous claims that "if the temperature continues for several days above 102.3° F. (39° C.) in a case of middle-ear inflammations it must be considered as a sign of the existence of otitic meningitis or of a sinus thrombosis." This is not an invariable rule, as occasionally a continuously high temperature for a week

(39.7° C., about 103° F.) may be due entirely to the tympanic inflammation. Again, such a case might mask a perisinous suppuration in a sinus thrombosis that had rapidly developed. In such an instance, if there are no local symptoms in the mastoid or in the external auditory canal indicative of mastoid empyema, the surgeon might be obliged to open the mastoid and perhaps the sinus for purely diagnostic reasons. If, after this interference, it should be found that the operation was not needed, and that the fever was due to tympanic disease alone, no harm can come from the surgical exploration, and the operator by acting in the same way in other cases will not be too late when the operation is really demanded by reason of the disease in the mastoid and sinus.

It must be borne in mind in this connection that furuncles in the auditory canal and periauricular abscesses may give rise to a body temperature of even 40° C. (104° F.); but in such cases the disease in the external ear and absorption by the lymphatics in the neighborhood are so plainly the cause of the fever that no observant diagnostician could refer the high temperature to any other cause.

Otitic pyæmia is held to be due not to an osteophlebitis, but to sinus thrombosis. If in a case of mastoid empyema and epidural abscess the temperature suddenly becomes high, having been normal perhaps before, it will thus become evident that the epidural abscess lies over the sinus, the wall of which has allowed the passage of toxins and micro-organisms into the circulation. Elevation of temperatures does not always occur as soon as the inflammation or suppuration reaches the sinus, because the strong outer wall of the sinus resists the encroachment of inflammation upon its inner surface and the consequent passage of toxins and micro-organisms into the circulation.

In some cases, however, the virulence of the micro-organisms is so great that the outer sinus wall is destroyed rapidly by the inflammation in the mastoid, and comparatively quickly a sinus thrombosis is found in close chronological connection with an acute disease in the middle ear. Leutert calls attention to the fact that typical chills at short intervals may occur in cases of perisinous suppuration without any thrombosis of the sinus.

Otitic brain abscess is sometimes attended with high fever at the beginning. This may be due to the attendant sinus thrombosis or meningitis. In other instances Leutert thinks that the high fever may be due to the extension of inflammation from the temporal bone and the drum to the pia mater, so that sometimes there exists in the early stage of a brain abscess a circumscribed leptomeningitis that causes a continued elevation of temperature until the affected parts of the pia are entirely shut off from the normal portion by adhesions. The leptomeningitis in such cases may be only a serous meningitis, never reaching a purulent stage, and rapidly passes away.

Leutert thinks this will explain the fact that lumbar puncture has shown a turbid cerebro-spinal fluid containing numerous white blood cells in cases in which the post-mortem has revealed no meningitis, as in such instances the lumbar puncture happened to be made during the existence of an evanescent serous leptomeningitis. He also states that most of the cases of brain abscess that have recovered after operation showed little or no elevation of temperature before operation, while those that have proved fatal showed high temperature indicative of infection of the meninges before operation was performed.

He concludes, therefore, that in the rare instances in which, on account of high fever, the diagnosis vibrates between sinus thrombosis and brain abscess, lumbar puncture enables us to decide upon the diagnosis. Furthermore, if only slight changes in the cerebro-spinal fluid are found by lumbar puncture the prognosis is not absolutely hopeless, and an operation, which may even then save life, must not be omitted.

Pneumococcic Empyema. Leutert calls attention to the "surprising fact" that in pneumococcic empyemata and epidural abscesses otorrhœa had ceased, as a rule, at the time of the manifestation of the infection of the mastoid and dura. The surgeon, therefore, must not cease to observe, or at least must not dismiss as positively cured, a patient who has had an aural suppuration of short duration (if it has been pneumococcic) even after complete restoration of hearing, since weeks later an empyema or an epidural abscess may develop from a latent focus of infection in the ear. Furthermore, we are justified in a case of pneumococcic suppuration, sooner than in other forms, in suspecting the occurrence of an epidural abscess, and at the operation we should endeavor to discover narrow fistulæ, and, if found, follow them to their termination. In cases in which the condition of the membrana tympani renders it undecided whether the suppuration is subacute or chronic the detection of pneumococci renders it certain that the suppuration is not a chronic one. Furthermore, it is highly probable that a part if not all of those cases reported as primary osteophlebitic mastoid diseases, because when first seen by the surgeon they were free from aural suppuration or any trace of it, were in reality empyemata of pneumococcic origin, but without any of the primary disease remaining in the drum cavity. Even the statement of the patient that there has never been a discharge from the ear and also a nearly normal hearing will not justify the diagnosis of a *primary mastoiditis.* In fact, the occurrence of such a disease is becoming more and more doubtful; it can usually be shown upon careful, unprejudiced investigation that it is *secondary* to some other disease in some part of the auditory apparatus. Leutert also shows that tuberculous middle-ear diseases are not as frequent as was once supposed. He reports two cases of suppurative otitis media in children of six months and seven months respectively, in which a normal ear was infected from the diseased ear by syringing septic matter from the diseased ear through the Eustachian tube across the nasopharynx into the well ear. Great caution should therefore be observed in syringing diseased ears in young children. A series of ninety-five cases are presented by Leutert on which the foregoing conclusions are based.

Epilepsy from Ear Disease.—M. LANNOIS (*Annales des mal. de l'Oreille*, October, 1899) reports the case of a man, aged twenty-six years, predisposed by his tuberculous heredity to nervous degeneration and epilepsy, who had an ambilateral otorrhœa since his seventh year, and became an epileptic at the age of puberty. Under the influence of treatment directed almost exclusively to the otorrhœa the crises became less frequent, and ceased entirely with cessation of the otorrhœa and improvement in hearing. During the treatment a return of the otorrhœa was followed next day by an epileptic seizure. Lannois believes that often aural disease and epilepsy coexist without any causal connection, but the case reported above he thinks is exceptional in that a causal connection really existed between the ear disease and the epilepsy.

Attic Suppurations.—E. MÉNIÈRE (*Ann. des mal. de l'Oreille*, December, 1899), though convinced that the most successful treatment in attic suppuration is excision of diseased ossicles, finds that patients will not always submit to such surgical interferences, not realizing the dangerous nature of their ear disease. In such cases he resorts to energetic cauterization of the attic by means of a saturated solution of chloride of zinc. In two cases, however, he has obtained also good results by means of the insufflation of "iodoformized ipsilene." This drug is a chloride of ethyl, holding iodoform in solution, obtained by a special process."

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

W. T. COUNCILMAN, M.D.,

SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY,

AND

F. B. MALLORY, M.D.,

ASSISTANT PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY.

Plasma Cells.—V. MARSCHALKO (*Centralbl. f. allg. Path. u. path. Anat.*, 1899, Band x. pp. 21–22) reviews the work which has been done on the plasma cell, gives the literature to date, and sums up our present knowledge of the subject.

Unna announced the discovery of the plasma cell in 1890. He claimed that it stained in a specific manner, namely, that with an old methylene-blue solution the protoplasm took a deep blue color. Jadassohn, v. Marschalkó, and later writers all regard the morphology of the cell as a more important characteristic.

Plasma cells when lying free are usually round or oval in form; when crowded together they are cubical, polygonal, or elongated. The protoplasm is not granular, but is denser at the periphery; in the centre adjoining the nucleus is a lighter area. The nucleus is round, almost always lies eccentrically or at one pole of the cell, and possesses a very characteristic chromatin network containing from five to eight coarse chromatin granules usually situated in the periphery, and one, rarely two, nuclei. In consequence of the large amount of chromatin the nucleus is stained deeply unless much decolorized. A plasma cell may contain two, three, or even four nuclei. The protoplasm tends to stain deeply like chromatin with basic dyes, especially methylene-blue. Plasma cells occur to some extent in normal tissues.

Unna claimed that plasma cells were derived from connective tissue-cells. It is now generally agreed, and may be considered as settled, that they are developed from the lymphocytes.

The plasma cells, long ago described by Waldeyer, prove to have been "mastzellen," consequently there is no objection to using the term plasma cell for the cell above described.

As the result of recent work, v. Marschalkó has come to the conclusion that plasma cells may form connective tissue cells.

In the same way that lymphoid cells change to plasma cells, the large mononuclear leucocyte may change into a different type of cell, of which the protoplasm tends to stain rather deeply with methylene-blue; these cells are called pseudoplasma cells.

As regards the general pathological significance of plasma cells, they represent cell elements produced from lymphocytes by progressive cell activity on the part of the organism in the protection of itself in various reactive processes; they form the greatest part of the so called round-cell infiltration; and after persisting, usually a rather long time, they either degenerate and disappear, or, at least in part, produce new connective tissue.

[The writer does not seem to be acquainted with Councilman's paper on "Acute Interstitial Nephritis," in which the lesion is shown to be due almost if not entirely to an infiltration of the renal tissue with plasma cells. Neither has he observed emigration of plasma cells, an act which has been pictured both by Councilman and by Mallory. v. Marschalkó's view that plasma cells give rise to connective tissue seems a step in the wrong direction; certainly the evidence on which he bases his conclusion is as yet wholly insufficient.—Ed.]

On the Staining of Granules in Leucocytes.—Arnold (*Virchow's Arch.*, 1899, Band clvii. p. 424) has studied the histological importance of the granular changes in both living and degenerating leucocytes.

He doubts if the granules are of great importance, though he shows them to be physiological factors, and not the results of artificial staining. He does maintain that these granules are concerned in the formation of threads which constitute a plasmasome or reticulum of definite importance in the cell life.

His investigations were carried on by what he calls "feeding," or saturation experiments. Thin sections of elder-pith were put into the lymph sac in a frog's back and left for six, twelve, or forty-eight hours. In order to observe directly the process of staining, he placed these sections on cover-glasses and mounted them with vaseline.

He stained the living cells by dusting particles of the stain on these sections of pith before introduction into the lymph sac. He used various stains, but obtained the best results with neutral red and methylene-blue. Eosin and fuchsin applied for some time brought out the finer granules. Biondi's triple stain gave a violet color to the delicate granules.

Permanent preparations were made by rubbing the sections of pith on cover-glasses as soon as distinct staining had appeared, and mounting in Canada balsam. The granules of the living cells take the stains quickly, but the color soon fades away. Laying the pieces of pith in a 10 per cent. solution of potassic iodide for a few minutes brings out the granular staining.

In the living cells he observed amœboid movements and activity of the granules. In the fully developed cells, where his staining methods showed a mesh of threads connecting the larger granules, he saw a dancing or streaming motion of the fine granules, both stained and unstained. The breaking up of larger into smaller granules and the changes of unstained into stained granules were best shown in the degenerating cells.

The relations of the granules to one another, their arrangement in rows and in threads, the transitional forms varying from fully stained to unstained, and from larger to smaller granules, point to the definite morphological and physiological importance of the plasmasome to the cell. He does not think, however, that it is yet possible with our present staining methods to demonstrate the granules as the bioblastic elements of the cell.

On the Histogenesis of Peripheral Nerves.—KOLSTER (*Ziegler's Beiträge*, 1399, Band xxvi. p. 190) presents the question, "Is the formation of the sheath of Schwann connected with the development of the myelin?" An answer was sought in the study of embryos of the salmon, rat, rabbit, and man stained by the Golgi method.

The *anlage* of the peripheral part of the anterior root is always in connection with the ganglion cells of the anterior horn. This advancing root in its growth pushes ahead of it the single-celled connective tissue layer which surrounds the cord. No nuclei are visible inside this layer, nothing but naked axis-cylinders, which increase wonderfully in number and but little in thickness. The development of myelin begins in the central nervous system, and proceeds rapidly to the periphery. The sheath of Schwann soon follows. This is true in fishes, but in birds and rabbits the mesodermic cells inclosing the roots proceed into the bundle before any myelin is present.

Hence Kolster concludes that there is no connection between the development of myelin and the sheath of Schwann.

The myelin and axis-cylinder are both ectodermal. The sheath is mesodermal, and therefore cannot be of a "nervous nature."

Kolster also corrects an error in his earlier work on the regeneration of the cut nerves, where he held that the sheath of Schwann was concerned in regeneration. He now holds that the axis-cylinder and myelin coat increase by continuous outgrowth from the central stump without any participation of the sheath of Schwann.

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are received only *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

DR. ALFRED STENGEL, 1811 Spruce Street, Philadelphia, U. S. A.
Or
DR. HECTOR MACKENZIE, 59 Welbeck St., Cavendish Sq., London, W., Eng.

377

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

APRIL, 1900.

A CONTRIBUTION TO THE DIAGNOSIS OF DIVERTICULA IN THE LOWER PART OF THE ŒSOPHAGUS.[1]

By Franz A. R. Jung., M.D.,
WASHINGTON, D. C.

The text-books tell us that œsophageal dilatations of a primary or idiopathic nature are extremely rare. Pressure diverticula usually are found in the upper third of the œsophagus. Traction diverticula are found in the lower third of the œsophagus, caused by adhesions of inflamed lymph glands. They are small and interest the pathologist only. This paper will not deal with them at all.

Late researches have shown that there is a third variety of diverticula in the lower part of the œsophagus of considerable size and importance. They are not produced by traction. It seems that they have usually been completely overlooked, because in an ordinary autopsy the lower part of the œsophagus is usually not examined.

The literature on the subject of idiopathic dilatation of the œsophagus comprises only 40 cases: Zenker and Ziemssen, 17; Kreuder, 3; Mermod, 1; Einhorn, 1; Leichtenstern, 1; Meltzer, 1; Rumpel, 3; Hölder, 1; Maybaum, 1; Jaffé, 1; Merkel, 1; Boas Netter, 1; Gussenbauer, 1; von Monakow, 1; Dreschfelder, 1; Kollat, 1; Chappet, 1; Westphalen, 1; Fleiner, 1; Kussmaul, 1. Five cases of true diverticulum of the lower œsophagus have been recorded: One case by Mintz, two cases by Reichmann, one case by Kelling, one case by Reitzenstein.

In only two of these cases had the authors an opportunity of proving their diagnosis by mechanical means.

---

[1] Read before the Medical Society of the District of Columbia, February 14, 1900.

Prcewosky is the only pathologist who found diverticula (not due to traction) in the lower part of the œsophagus. These diverticula, however, were not larger than a hazelnut. We cannot be too particular in making an accurate diagnosis of such rare conditions.

Reitzenstein, after investigating the cases of Strümpell and Klemperer, rejects them as not being true diverticula, and takes into consideration only the cases of Mintz, Reichmann, Kelling and his own. Mintz's case demonstrates distinctly the two different "swallowing sounds." His patient vomited matter of the previous day without bringing up the food eaten the same day. Mintz did not make Rumpel's test with the two tubes. Neither did Reichmann make use of his test. His first case was examined only superficially, and must, therefore, be considered as doubtful; his second case furnishes better proof. An œsophageal sound showed the passage into the stomach to be free after the diverticulum had been emptied of its contents. When pouring in water to the amount of 400 c.c. about 300 c.c. ran through into the stomach, while 100 c.c. remained in the diverticulum.

Kelling mentions that Mercier's œsophagus sound has been used and appreciated only by Leube. Kelling's case has been thoroughly examined and described. He arrived at his conclusions in a way different from Rumpel by making use of the second "swallowing sound." His résumé is as follows:

1. If the tube slips easily into the stomach, one can exclude ring-shaped, anatomical strictures.

2. If the tube does not penetrate at all into the stomach, the contents of the œsophagus are removed and a stiff tube is introduced. This is closed at the end and has one perforation at the side. Through this tube lukewarm water is poured in, and if by auscultation gurgling sounds at the cardia can be recognized, the attempt is made to push the tube further down. If, while the gurgling sound is audible at the cardia, the tube slips readily into the stomach the case is one of spasm. If, however, in spite of the running in of water the tube does not go further down the probability is that there is no spasm.

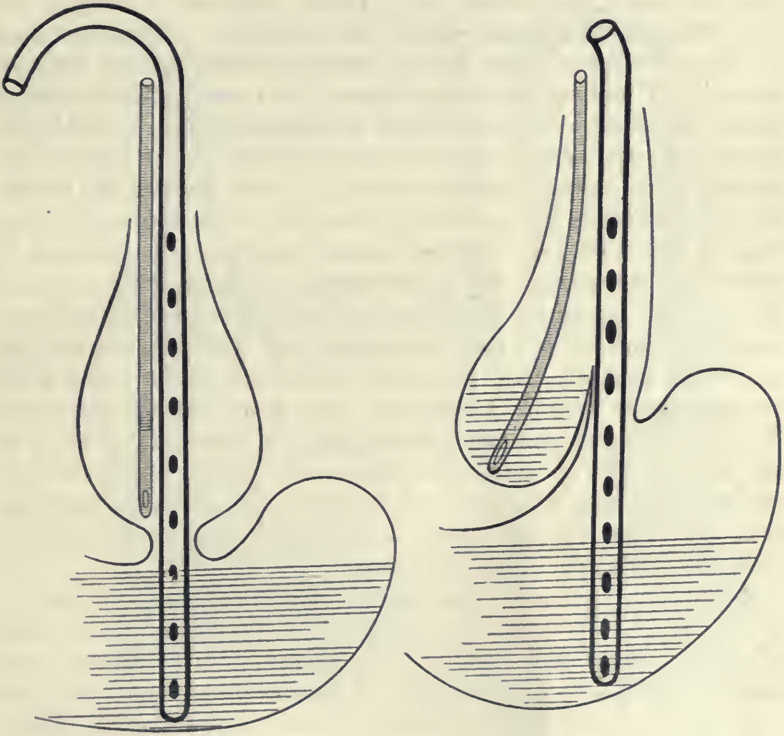
3. If the tube is arrested in the œsophagus and remains immovable in this position for a while, and then suddenly slips into the stomach, it proves the presence of spasm.

The presence of the swallowing sound is not an infallible test, however, for there are cases:

(*a*) Where the position of the œsophagus sound or its change from one position to another cannot be demonstrated.

(*b*) The second "swallowing sound" may be absent in diverticula, as Reitzenstein and Reichmann's second case have shown. On this point Kelling's method of diagnosis cannot be relied upon. The second swallowing sound is not usually present in cases of dilatation with spasm of the cardia. In the forty-one cases reported the sound was either missing entirely or heard much later, or else was of a different character. It may also happen that the second sound immediately follows the first, as in Westphalen's case. Sometimes the two swallowing sounds can be heard at the back and not at all at the sternum. Again, only the first sound may be heard at the sternum, and not the second. Westphalen describes the sound which immediately follows the first gurgling sound as though a fluid were pouring into a pot partly filled with water. This was also the character of the sound recognized in my first case at the back, but not at the sternum.

FIG. 1.



Rumpel has recently made use of a most valuable test to show the difference between diverticulum and dilatation. He employs two tubes, one with numerous perforations in its lower third is passed directly into the stomach, the other into the œsophagus above the cardia (Fig. 1). Water, which is poured through the œsophagus tube, will run down into the stomach through the perforated tube in case of a dilatation. In the event of a diverticulum this will first be filled, and only the overflow will run into the stomach. The contents of the diverticulum can be returned through the œsophagus tube and accurately measured. The main condition of this test is that the perforated tube really enters the stomach. This, however, is often accomplished only with the greatest difficulty. In cases of large dilatation one rarely succeeds in finding the cardiac opening. The patient often believes the tube to be in the stomach when it is not; in the beginning of the disease the patient is able to locate the tube correctly, but as the disease advances the feeling of resistance is wanting, and a chemical analysis alone can furnish proof positive whether the tube was in the stomach or bent upon itself within a dilatation which may have a capacity varying between 400 and 1000 c.c. Rumpel's experiments cannot furnish the proof that the tube has entered the stomach, as no gastric juice can be obtained, the perforations in the tube preventing the return flow. One might pour in large quantities of water, thereby proving that the stomach has been reached. If medium quantities of water not showing any reaction of gastric juice can be returned through the œsophagus tube it would indicate that the tube had not passed beyond the cardia. Since, however, the capacity of the stomach varies according to Ewald between 250 to 1680 c.c., and Netter's as well as Hölder's cases show even œsophageal dilatations of over 1000 c.c., it follows that no accurate conclusion can be drawn from the amount of fluid introduced. If found that one and a half litre can be poured in without any return flow from the second or œsophagus tube, the fact must be accepted that the first lower tube has entered the stomach. The perforation of the tube makes it impossible for the water to return. If now one pours more water through tube No. 2 it will not run into the stomach, which is already full, even if we had to deal with an œsophageal dilatation. This might produce the erroneous idea of a diverticulum. In other words, when the proof has been given that the tube is in the stomach it becomes impossible to make use of Rumpel's diagnostic test.

Reitzenstein appreciated this difficulty and tried to prove the presence of the tube in the stomach by palpation or inflation of the stomach. With a perforated tube inflation is an impossibility. Palpation is not always possible, as Boas has shown. In order to prove stagnation about the cardia it is absolutely necessary to show the differential analysis between the contents of the stomach and œsophagus.

My endeavor was to use the perforated tube test and at the same time examine gastric juice for HCl and ferments, proving thereby that the tube was doubtless in the stomach. I therefore made the following experiment: An ordinary stomach tube with about ten small holes distributed over a length of 30 cm. was introduced. Into this tube I put a smaller one, which had only two holes at the end. This double tube is capable of giving a double proof. (The inner tube can be very thin, if one is satisfied with one test alone.)

1. If one introduces the double tube into the stomach one can readily aspirate gastric juice through the inner tube. (Should this tube be very thin the gastric contents can be diluted by pouring in a definite small quantity of water.)

2. The stomach can be filled and emptied at will.

This water test can now be made without in the least interfering with the rest of the experiment. With Rumpel's perforated tube a return flow of water cannot take place. If water is now poured through the œsophagus tube:

FIG. 2.

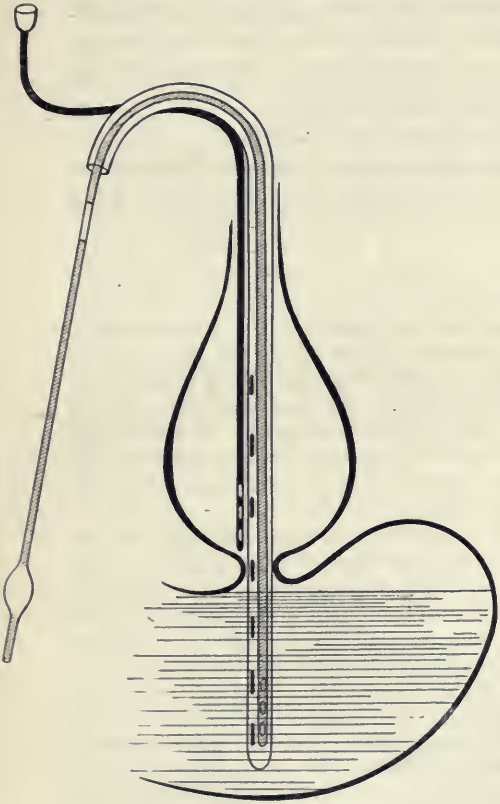
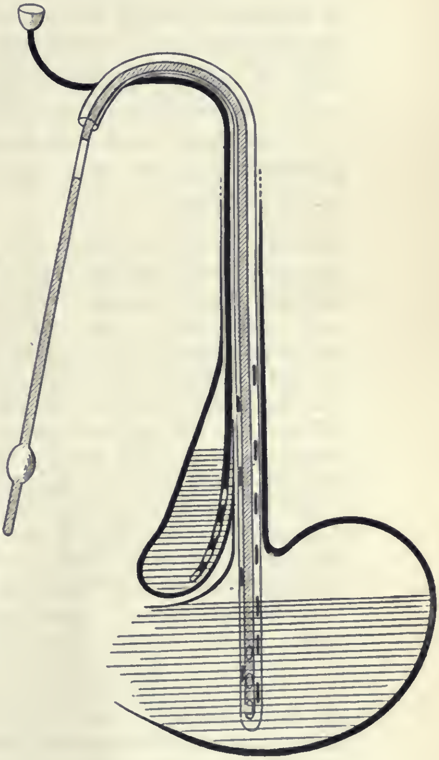


FIG. 3.



a. In case of dilatation the water will run through the perforation of tube No. 1 into the stomach, the inner tube being no obstacle. Besides this, the inner tube can be removed after having accomplished its purpose of aspirating gastric juice (Fig. 2).

b. In case of a diverticulum a certain amount of water will remain in the pouch, and can be returned through the œsophagus tube (Fig. 3).

The inner tube may be made of soft metal, thereby giving a certain amount of stiffness to the outer tube. One could also give it the bend of Mercier's sound. This latter would be necessary to satisfy Kelling's demands. My own experiments were made by means of a rather stiff stomach tube and an inner tube 65 cm. long, on the order of a ureteral catheter. This inner tube has sufficient firmness to be pushed in and out as necessity arises. The patient swallows the perforated stomach tube, and I afterward introduce the inner tube. If the entrance to the stomach is difficult to find, the double tube, with the inner tube of soft metal, to which is given the curve of Mercier's sound, is introduced. If by this method of experimentation it has been proved that the perforated tube is in the stomach, no water ought to return from it, at least not before the stomach is filled to overflowing.

Reitzenstein does not lay sufficient stress upon this fact.

I found that every time when water could be returned through the perforated tube this latter was not in the stomach, but bent upon itself in the œsophagus.

Case I.—On June 22, 1897, a man came to my office in a state of exhaustion. It was believed that he had a cancer of the stomach. He had lost twenty pounds during the last few months. He could not eat, and could swallow only with the greatest difficulty. Food could not be retained. Besides, he was subject to the most painful cramps in the pit of the stomach, for which physicians had resorted to morphine. He was determined not to continue this drug on account of its unpleasant effects. As the patient complained of difficulty of swallowing for four years, and had been subject to cramps previous to that time, the diagnosis of carcinoma was questioned.

W. W. P., captain of police, is sixty-four years of age. His father died of old age at eighty-four years. Mother died of typhoid fever. No hereditary taint. Patient had in his youth suffered from typhoid, variola, spotted fever, and malaria. He developed, however, into a strong, robust man. He admits that he eats hastily, and his daughter relates that he gulps down whole tumblerfuls of ice water at a time. In his younger days he used to smoke from fifteen to twenty cigars a day. When about forty years of age he commenced to suffer from fulness after eating. Soon after this cramps developed, which reached an intense degree. Patient describes these in the following manner: When least expected he suddenly experiences a slight pressure in the pit of the stomach. He knows at once what this signifies, drives home as quickly as possible, and goes to bed. The pain intensifies so rapidly that the patient has to press hard with both hands on his stomach in order to get some relief. At the height of the attack he is not able to breathe, and almost chokes. By degrees the contraction subsides, and he is able to breathe again with peculiar sighing sounds. The pain seems to cut off the respiration, as he expresses it. Physicians have given him injections of morphine, and the patient chloroforms himself. Every imaginable diagnosis had been made: spasm of the finest bronchioles, asthma, liver colic, gallstones. During all these years the patient had dyspepsia, but did not vomit. About six years ago he commenced to raise food, and at the same time the fulness after eating diminished. At first the vomiting seemed to ease his pain, but later it remained the same. The vomited matter was often mixed with mucus. Patient was not able to tell whether the ejected food came from the œsophagus or from the stomach. He always called it "vomiting." After two more years of this condition the patient became almost unable to swallow. He could help himself, however, by taking water between each mouthful. Later this always failed. Patient often ejected his whole meal over the table in the midst of such a swallow. He commenced to eat alone, and became melancholic and despaired of medical aid, as the "physicians prescribed remedies for him, but no one could teach him how to get them into the stomach." Patient lost flesh rapidly. Only during a short time he got a little relief while a physician had attempted to pump him out; but this was soon abandoned. Shortly before the patient came to me he had been through one of his fearful attacks of cramps. When he had diarrhœa he always knew that an attack was coming on. Whenever he felt it approaching he had an irresistible desire to lie down. Again, he was much troubled at night by coughing, and had to vomit mucus before he could find rest. The only position in which he could sleep was with his thorax raised. Sometimes he is better able to swallow by putting his head as far back as possible. He feels that the food meets with resistance before passing into the stomach. At such times, then, there cannot be spasm of the cardia, but another obstacle higher up (as found later this obstacle was the entrance of the diverticulum).

Status. Height, five feet eleven and one-half inches; man with large frame, faded skin, heart sounds normal, pulsus tardus, but alike at both wrists; no pronounced arterio-sclerosis; patellar reflexes not increased; no dulness along the spinal column.

Upon introduction of the stomach tube about 300 c.c. of stagnating food came out. At a distance of 41 cm. from the teeth the tube met with a resistance. After repeated attempts with large tubes the stomach was finally reached. This was proved by the analysis of the matter brought up. The fact that the largest sounds passed the obstacle easier than the thin ones, together with the long duration of the disease, decidedly excluded carcinoma.

The stomach splashed as low as two fingers below the navel. Liver was not enlarged. Urine contained neither albumin nor sugar. The material withdrawn from the œsophagus was usually of a sweetish odor, in three layers, and mixed with much mucus. All subsequent examinations showed the same characteristics and large quantities of food of the previous day. Spinach was especially easily recognized, and had sometimes been eaten two days before. I succeeded in putting a Boas test-meal into the stomach through the tube. After an hour it was removed, and showed the following analysis:

Total acidity, 30; free HCl, 0.036 per cent.; congo, phloroglucin vanillin. Tropæolin gave a positive result; pepton and propepton present; rennet ferment present; rennet zymogen; milk coagulates until a dilution of 1 : 80 is reached. Sugar test weakly positive; starch and achroodextrin present; lactic acid present in small quantity.

The analysis of the contents of the œsophagus on the same day showed the following:

Total acidity, 11; congo test, weakly positive; phloroglucin vanillin; tropæolin reaction absent; no biuret reaction; no rennet ferment; no rennet zymogen; sugar reaction strongly positive; lactic acid strongly positive.

The opening into the stomach frequently could not be found. Besides, the patient could not bear much manipulating because of great pain. When I tried to pass thick elastic tubes, in order to let them remain for some time, I had to give it up on account of supervening cramps. At other times the patient suddenly felt the tube slip as if into the stomach. It conveyed the same sensation to my fingers. Usually, however, I could not pour water through the tube, or, if so, very little. Matter brought up showed no HCl or ferments. The tube simply had bent into a curve and remained in the space above the stomach. If the tube really was in the stomach it became an easy matter to pour water in and out. If a weak solution of eosin was put into the stomach and a solution of methyl-blue through a second tube into the œsophagus, both solutions could be returned with their original color. The amount of food in the œsophagus in the morning varied between 210 to 300 c.c. The microscopical examination of the œsophagus contents showed:

Vegetable cells, fat globules, starch granules, yeast in large quantity, bacilli; a very active variety of coccus.

In order to make an accurate diagnosis between dilatation and diverticulum or dilatation with diverticulum, I made my test with the inner and the œsophageal tubes, as described above. After the œsophagus was emptied of its contents I tested the presence of tube No. 1 in the stomach. The inner tube was very readily passed in and out for this purpose. The contents of the stomach, as brought up through this inner tube, showed the following analysis (three different experiments): Total acidity, 80, 100, 150; free HCl, 0.18, 0.14, 0.328; congo, phloroglucin vanillin, tropæolin strongly positive; ferments positive.

The contents of the œsophagus during the same experiments showed the following reaction: Total acidity, 26, 21, 20; free HCl, none; no ferments; sugar test positive; lactic acid reaction strongly positive.

Whenever 400 to 500 c.c. of water had been poured in about 180 to 225 c.c. could be returned through the œsophageal tube introduced to a distance of 45 cm. The rest of the water could be returned through the inner tube from the stomach. The degree of acidity of these two fluids was always very different. Both were acid, but the œsophagus water reacted feebly upon congo, while the stomach water showed a marked reaction. If the œsophagus was filled to the limit it could hold 500 c.c. About 200 c.c. of this, as shown above, were contained in the diverticulum. The gastrodiaphane showed an illuminated zone at the processus ensiformis sterni, which did not correspond to the level of the stomach (Fig. 4, A). This transparent zone was situated above the upper border of the stomach, which could be distinctly demonstrated by inflation. The electric light could be pushed below this point and to the left at other times, transilluminating the stomach proper (Fig. 4, B). The examination by means of the X-rays did not give very satisfactory results as far as details are concerned. Yet a very useful point was determined. The accompanying sketch (Fig. 5) gives a posterior view, the broadening of the shadow corresponding to the spinal column is caused by the dilatation of the œsophagus. The distinct bulging to the right shows the location of the diverticulum. I had filled the œsophagus with a bismuth solution and also made the

FIG. 4.

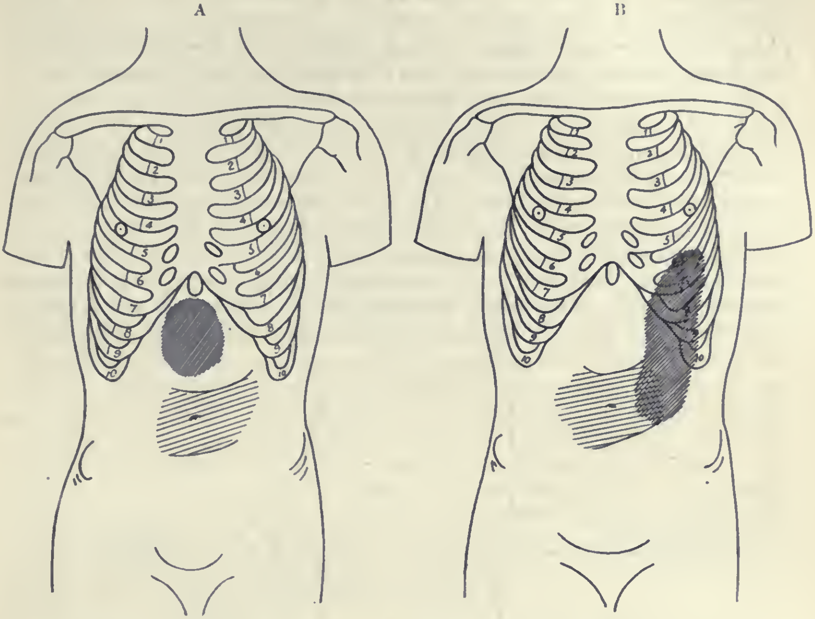
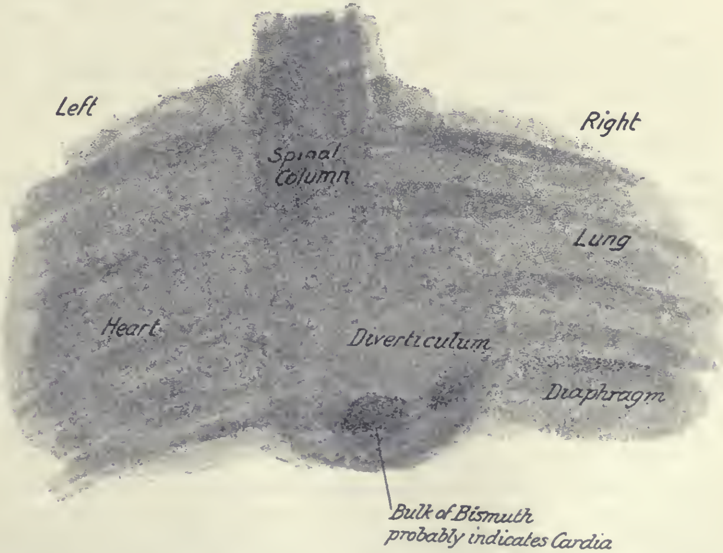


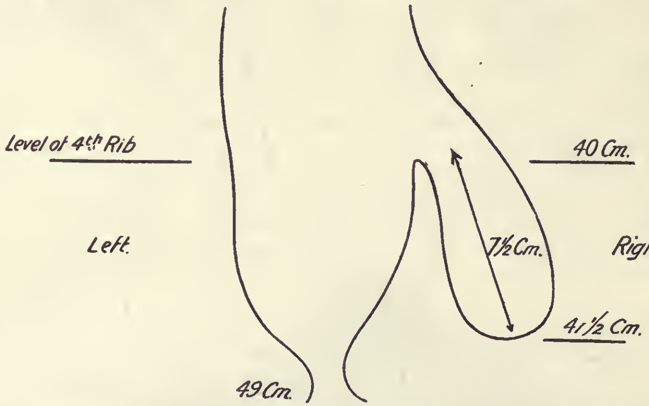
FIG. 5.



patient swallow some bismuth tablets. Besides this I had introduced a lead sound. The latter is scarcely visible in the picture. The bismuth tablets show most distinctly as the darkest spot on the positive. It was interesting to notice the motion of the diaphragm before we exposed fifteen minutes. These excursions extended over 5 cm. By subtracting these from the height of the diverticulum, thus correcting the enlargement of the shadow caused by the respiration, we obtained 7½ cm. as the actual height of the diverticulum. The skiagram shows distinctly that the diverticulum was situated above the diaphragm.

The oscillations in the manometer test were inverse in the stomach to those in the œsophagus. This also proved the diverticulum to be above the diaphragm. The opening of the diverticulum could not be found by means of the test used by Kelling. I could hear only the first swallowing sound at the sternum. The second sound never could be heard in all my experiments. Immediately following the first sound at the sternum there could be heard a second at the back, such as Westphalen has described.[1] It sounded as though liquid fell into a pot which already contained liquid. This sound was not always audible. If the diverticulum was filled with 200 c.c. of a solution of methyl-blue the outside white part of a double tube showed the blue discoloration at a height of 7½ cm. This test corresponds exactly with the measurements of the diverticulum on the photographic plate. Whenever an entrance into the stomach or diverticulum was forced the patient complained of a scratching pain at a distance of 40 cm. from the teeth. A stiff tube could be passed into the diverticulum to a depth of 47 cm. The cardia was at a height of 49 cm.

FIG. 6.



When the diverticulum was filled with 200 c.c. of water and a connection made with the outside in the manner of communicating tubes, the entrance of the diverticulum was indicated by the level of the fluid at the height of the fourth rib. The above picture was obtained (Fig 6).

The subjective feelings of the patient corresponded exactly to these measurements. At X the first resistance was met, and only at X the two separate openings had to be forced. This obstacle once passed, a soft tube could bend itself as well in the œsophagus above the cardia as in the diverticulum. In both events it was an easy matter to introduce 50, 60, or 65 cm. of tube. Often one imagined being in the stomach until the inner tube proved the fallacy of the supposition. After the X-ray had demonstrated that the diverticulum was to the right it was an easier matter to reach the stomach than before, by observing the following rules: Starting at the right corner of the mouth I directed the tube to the left, to a distance of 39½ cm. from the teeth. Now the inner tube was passed through the perforated one, the lower end having previously been bent after the pattern of Mercier's sound. Into the inner tube I had put a thick copper wire in order to preserve the angle. Sometimes I introduced at once the perforated tube, holding the inner tube and wire. By this method I was enabled to reach the stomach with ease by keeping to the left after 40 cm. of the tube had been swallowed. The cardia resisted comparatively little. The œsophageal tube was always directed to the right. I also made the following experiment: With all three tubes *in situ* I poured water through the inner of the double tubes into the stomach, and 200 c.c. of colored liquid was poured through the œsophageal tube into the diverticulum. After waiting a while both tubes were lowered, and the œsophageal tube emptied the diverticulum of its colored contents, while the stomach tube returned clear water without a trace of color.

---

[1] Westphalen: Archiv für Verdaunngs Krankheiten, Band v., Heft 1.

Since the patient has learned what is the matter with him he says that he vomits from both the stomach and the œsophagus. The vomiting of the œsophagus is done with ease and without nausea, whereas the stomach emesis occurs only after great straining and nausea. The patient thus wishes to correct his former statements, wherein he called everything ejected from the mouth vomiting.

I have carefully observed the patient for over two years, and yet clearness on certain points was obtained only be degrees.

Lavage of the œsophagus made the patient quite comfortable. His weight has steadily increased, and he is stronger and better than for years. He is perfectly able to perform his duties as a policeman. He no longer suffers from cramps. The diverticulum is never empty, yet the difficulty of swallowing is considerably diminished. He feels best of all on a semi-fluid diet. Milk-toast is a favorite dish with him, and of sugar he cannot get enough. His weight is 168 pounds. The spasms were cut short by the administration of small Seidlitz powders, which saved him from morphine, chloroform, and cramps. As these powders also play a part in my second case, I shall refer to them again.

Case II.—On March 8, 1898, a patient consulted me and stated that she is often obliged to leave the table either on account of violent cramps or vomiting. A physician had treated her by daily lavage without giving any relief. I requested her to write down her case-history, drawing her attention to the most important points.

Twenty years ago Mrs. S. had malarial fever. When she had sufficiently recovered to be about again she commenced to suffer from violent cramps in the region of the stomach. In the middle of the night she was often surprised by an attack. The more physicians she consulted the more names were given to her trouble. In the course of time she commenced to vomit without experiencing any nausea. The food simply came up and was expectorated. Patient also suffered from water-brash. At all times and in the most uncontrollable fashion she would bring up large quantities of slimy water. At night this fluid often came even through the nose if her head was low. Twelve years ago she began to experience difficulty in swallowing. The attending physicians were unable to recognize the nature of the trouble, and her family despaired of her recovery. She lived on rice and cream, but the attacks did not diminish. Her symptoms had come one by one in the course of years. First painful stomach cramps, then vomiting without nausea, and, lastly, difficulty of swallowing. Patient is able to state very accurately whether food reaches the stomach or not. The pressure in the latter case is very painful, especially over the left side under the breast. The heart beats with a violence almost unbearable, and her arms and hands are cold as ice. Mrs. S. is obliged to walk up and down with her arms raised above her head and holding her breath. Suddenly the inside resistance seems to yield, she feels the food rush down, and the attack is over. Patient can now return to the table and eat, although usually too exhausted to do so. Cold beverages are her worst enemies. A tumblerful of ice water at meal-time invariably brings on an attack, which Mrs. S., like the first patient, compares to choking. Between meals the patient is able to drink, yet has to be very careful. Mrs. S. is absolutely sure that often the ejected food is a day old, sometimes even two days. She also noticed that it is not at all mixed with the last eaten food. She very rarely vomits from the stomach. At night she is troubled with coughing and prevented from sleeping. She cannot lie down flat. Carbonic acid gas in any form gives her the greatest relief. Sometimes the drinking of large quantities of water produce vomiting, and thereby relief. Patient is of a nervous temperament. She considers the severe malarial fever of her youth the cause of her trouble. Of course, she did not suspect the real nature of her disease.

Status. Small size; weight, 130 pounds. Mild anæmia. Patellar reflexes somewhat exaggerated, no hyperæsthesia, delicate constitution. Heart normal, pulse 72, goes to 85 as soon as patient is excited. It is an easy matter to raise up 100 c.c. slimy food remnants from the œsophagus. At the level of the cardia one meets with an obstruction which cannot always be overcome. At times one succeeds in getting into the stomach, as shown by subsequent analysis. The contents of the œsophagus never showed free HCl or ferments, while lactic acid and sugar were always plentiful. With much difficulty I succeeded in getting a test-meal into the stomach proper. The analysis after an hour was as follows: Total acidity, 40; free HCl, 0.07 per cent.; starch, achroodextrin; lactic acid, weak; ferments, positive.

A diagnosis of cardio-spasm with dilatation of the œsophagus was made. As soon as the tube reached the cardia a most painful spasm occurred. Elastic solid sounds could not be used at all. Sometimes the use of the tube had to be abandoned, because a cramp would occur as soon as the lower end of the œsophagus was reached. Quite accidentally we found that it was not always necessary to resort to morphine or chloroform to overcome the painful spasm, as a small Seidlitz powder would do the same, and the effervescing bromo-water proved especially effectual. The carbonic acid gas seems to have a decided effect upon the innervation of the muscle, as is also the case in atony of the stomach. Very small quantities were sufficient to secure prompt relief. In severe cases I give first a solution of sodium bicarbonate, and follow it by one of acid tartar. My first case was thereby entirely relieved from the necessity for narcotics, and Mrs. S. writes me that the cramps are very rare under the use of an effervescing bromo-water as a table water.

Internal faradization with Einhorn's electrode benefited the patient very much. To my regret she had to go West, and I was unable to follow up the case personally except by correspondence. I hope in a few weeks, when she returns to town, to make my experiment with the perforated double tube, thereby making a correct diagnosis.

The second swallowing sound was not audible in this case.

All her symptoms point to spasm of the cardia with dilatation of the œsophagus. Only one symptom argues against this—a symptom thought of much importance by Mintz. Patient vomits food taken on previous days, while food of the same day seems to remain down. One might think that in a pouchy dilatation without diverticulum this might be possible. Certainty will only be obtained by making the double-tube test.

This article was written more than a month ago, and the patient in question has returned in the meantime. Examinations were resumed. They are extremely difficult on account of the cramps of the cardia. The average result of frequent soundings with the three tubes was that about 120 c.c. usually remained above the cardia and could be removed again through the œsophageal tube, thus proving the presence of a diverticulum. The test with colored fluids proved the same.

Kelling's test was tried with negative results. When water was poured through a stiff tube with only one lateral hole near the end the gurgling sound produced by the running of the water from the tube was heard, but never a real second swallowing sound. I made the further observation that it was sometimes possible to introduce the tube into the stomach after a small Seidlitz powder had relaxed the spasm. Since this was a case of subacidity it was very often not the presence of free HCl which proved the main tube to be in the stomach. As the examinations were frequently made without test-meals and preferably with an empty stomach, the total acidity of the œsophagus was sometimes higher than that of the stomach proper; for instance, 25 stomach, 32 diverticulum.

Nevertheless, the differential diagnosis proved that both tubes were lying in different cavities. The amount of lactic acid and of sugar was always higher in the œsophagus than in the stomach. After test-meals of course the most accurate differential analysis could be made.

The vomiting of masses two days old was explained by the presence of a diverticulum. It seems to be very safe to rely upon this symptom in cases where examinations are not possible.

Both my cases were again examined with the diaphane, and I succeeded in both in transilluminating a zone corresponding to the position of the stomach proper.

The exclusion of ring-shaped organic strictures on the base of scars, carcinoma, etc., is easily made, as Netter, Rumpell, Kelling and others have shown. In the differential diagnosis of diverticula it will be well to consider the following points:

1. With dilatation as well as with diverticula there occur painful cardio-spasms (Kelly, Jung) as well as painless cases (Reitzenstein).

2. In both vomiting occurs from the œsophagus, occasionally from the stomach. Even in cases of typical cardio-spasm eructation from the stomach may occur.

3. If food is vomited, eaten one or two days before, while other food eaten in the meantime remains down, the case seems to be one of diverticulum. No observations to the contrary have been made so far.

4. The swallowing sounds are abnormal in all cases of dilatation. In cases of diverticula the swallowing sounds are audible in 33 per cent., and can be used for diagnostic purposes (Kelling's method). Westphalen's sound can also be heard in diverticulum with dilatation of the œsophagus (Jung).

5. If after emptying the œsophagus it is easy to enter the stomach a diverticulum probably exists (Mintz, Reichmann). Yet the passage of the tube may be difficult. "Only once out of ten experiments does one find the cardia and gain entrance into the stomach" (Reitzenstein).

6. In making Rumpell's test, proof must be furnished that the tube is actually in the stomach. Inflation in this case is impossible, as feeling of the sound is not always practicable.

7. The proof positive of having entered the stomach is obtaining gastric juice through the inner tube (Jung).

8. Mercier's sound or Leube's diverticulum tube are necessary in order to find the entrance into the stomach. These tubes must be perforated for the diverticulum test, and by means of a thin inner tube gastric juice can be brought up.

9. After a diverticulum has been diagnosed its height can be ascertained (*a*) by Kelling's test (swallowing sounds) and (*b*) by filling the diverticulum with a colored solution and putting a narrow strip of white adhesive plaster longitudinally on the tube.

10. Neubauer's experiment for ascertaining the level of the liquid can also be used according to Kelling to determine the entrance into the diverticulum.

11. The entrance of the diverticulum can easily be overlooked by œsophagoscopy.

12. Gastrodiaphany did not show the diverticulum in Mintz's case, and gave no information about the kind of enlargement. In Reitzenstein's case it was possible to make the diagnosis diverticulum by gastrodiaphany alone.

13. X-rays show an enlargement of the œsophagus only.

14. The statements of even the most experienced patient, that the tube is in the stomach, are often erroneous. The bending of the tube

gives the patient and physician alike a sensation as though the tube had entered the stomach.

REFERENCES.

Netter: Archiv für Verdauungs Krankheiten, 1898, Band iv., Heft 2.
Reitzenstein: Münch. med. Wochenschrift, 1898, No. 12.
Westphalen: Archiv für Verdauungs Krankheiten, 1899, Band v., Heft 1.

THE CLINICAL ASPECT OF PLAGUE.

WITH ILLUSTRATIVE CASES.

BY FRANK G. CLEMOW, M.D. Edin., D.P.H. Camb.

I.

It can scarcely be claimed that the last word has yet been said upon the terribly fatal disease which has caused such ravages in India and elsewhere during the past few years. Little apology is therefore needed for any further contribution which may tend to throw light upon the nature of the malady, and I gladly comply with the request of one of the editors of this JOURNAL to communicate an article upon the subject.

The following notes are an attempt to put upon record the clinical facts of plague as they have been observed by myself in a large number of cases. They do not lay claim to be in any sense a full and complete description of the disease. Considerations of space alone would have prevented the undertaking of so great a task. They are confined entirely to the clinical aspect of plague. The etiology, bacteriology, mode of spread, pathology, prognosis and treatment of the disease, if alluded to at all, are mentioned only incidentally and as briefly as possible, and where it seemed necessary to refer to them in illustration of the clinical appearances.

The general character of plague and the principal symptoms and signs which usually characterize an attack of the disease have been so repeatedly described that it appears unnecessary to give any preliminary account of them before commencing a discussion in some detail of the clinical phenomena of the disease.[1]

Four principal varieties of plague have been recognized, depending upon the channel by which the bacillus associated with the disease enters the tissues of the patient, and the clinical features in each instance are to a great extent modified by this primary factor in the production of the disease. The four varieties are the following:

---

[1] The present paper will be based principally upon the clinical notes of 502 cases of plague admitted to the Parel Old Government House Hospital, Bombay, during the nearly three months the author was in charge of it, in addition to notes of 152 cases already in the wards at the commencement of that period, and of a large number of cases seen in the hospitals and in district work in Calcutta.

1. *The bubonic variety of plague,* in which the bacillus appears to enter the body through some abrasion or discontinuity in the skin, and passes at once to the nearest lymphatic gland or glands, where it proceeds to multiply, causing in consequence inflammatory swelling of the gland or glands involved.

2. *The pneumonic variety of plague,* in which the bacillus gains primary access to the lungs and produces a specific affection of these organs, of the nature of a lobular pneumonia.

3. *The septicæmic variety of plague,* in which the bacillus probably enters the system in the same manner as in the bubonic variety, but, instead of remaining for a time in a lymphatic gland and producing a bubo, appears to pass almost at once into the general lymph stream and to affect a very large number of glands throughout the entire body. As the word septicæmia implies, the bacillus in these cases probably gains access to the blood-stream very rapidly—more rapidly than in the bubonic variety of the disease. Fatal cases of the latter and of the pneumonic variety very frequently, if not always, become septicæmic before death; that is to say, the bacilli escape from the gland in one case and the lung in the other and enter the general blood-stream. The term septicæmic, as applied to the cases included in the group under discussion, is, perhaps, a not altogether satisfactory one, for there is good reason to believe that the bacillus never grows primarily in the blood-stream; it appears to require a preliminary stage of growth, either in the lungs or in some part of the lymphatic system—whether in one or many glands—where it can produce a sufficient quantity of toxins to overcome the protective forces possessed by the blood against an invasion of bacilli. This is a pathological question which it would be out of place to discuss more fully in the present paper, where it is intended to deal only with the clinical manifestations of the disease.

4. *The abdominal, or enteric, variety of plague.* A group of cases have been described in which the symptoms of gastro-intestinal affection are unusually marked, and in which it has been thought that the bacillus has entered the body by means of the gastro-intestinal tract, either in food or in drinking-water. It will be shown, in discussing the phenomena of plague in connection with the alimentary system, that abdominal symptoms are in some cases unusually prominent, but the proof that these cases are produced in the way described is wanting, and, for the present, it must remain an open question whether this mode of infection does occur in the human body.

Of these four varieties of plague the bubonic is, in most epidemic outbreaks, by far the commonest, cases of this kind contributing from 80 to 90 per cent. of the total cases. It is to this variety of the disease that the following notes in the main refer, incidental reference only being made to the other varieties mentioned. In these notes, I should wish to add, only the clinical features proper to an attack of plague are dealt with; considerations of space alone prevented a discussion of the innumerable complications and sequelæ which are so commonly associated with the disease.

The Temperature. The temperature-chart in a case of plague shows no such characteristic curve as is commonly met with in many other febrile diseases, such, for example, as relapsing fever or ague. The rise from the normal is probably more or less rapid, but in hospital practice in India it is rare to see a plague patient during the period of onset, and most usually at the time of admission to hospital the fever has already attained a considerable height. More often than not the temperature is over 103° on admission, and temperatures of 104°, 105° and even higher are not very uncommon. In perhaps the majority of cases the temperature rises at some period in the course of the attack to over 104°. In some cases it may rise before death to 106°, 107° or 108°. These high temperatures are usually met with immediately before death; but this is not invariably the case, and death may be preceded by a marked fall of temperature even down to or below normal.

The following figures may help to throw some light upon the relation of the height of the temperature to the severity of the attack. They show the percentage mortality in cases grouped according to the highest point attained by the temperature at any period of the illness. In the first two groups, it should be noted, the thermometer rose to 104° or 105° on more than one occasion in some of the patients. In the last three groups the temperatures of 106°, 107° and 108°, respectively, were reached on one occasion only in every case.

Table I.

Highest temperature at any period of attack.	Number of cases.	Died.	Percentage mortality.
Between 104° and 105°	217	187	86.18
" 105 " 106	68	57	83.8
" 106 " 107	13	12	92
" 107 " 108	1	1	100
108°	1	1	100
Total above 104°	300	258	86

The percentage mortality among the 300 patients in whom the temperature rose above 104° was 86. On the other hand, in 202 patients under treatment at the same time and under exactly the same circumstances, but in whom the temperature did not at any time rise as high as 104°, the mortality was only 73.7 per cent. It would seem, therefore, that a rise of temperature to above 104° F. is a distinctly unfavorable sign. It is somewhat remarkable that the mortality in the second group (patients whose temperature rose to between 105° and 106°) was somewhat lower than that in the first group (patients whose highest temperature was between 104° and 105°). The safest conclusion to draw from these figures—and it is one supported by general impressions—would appear to be that while a temperature of 104° or over is an unfavorable prognostic sign, a rise to 105° is not more unfavorable than a rise to 104°, but that above this point each further rise of temperature implies a more severe attack of the disease and a graver prognosis.

Of 15 cases in which the temperature rose above 106°, only 1, it will be observed recovered, while of the two patients in whom the temperature rose above 107° and 108° respectively both died. The following are brief notes of three of the cases just referred to:

CASE I. (Register No. 757. Recovery after a rise of temperature to 105°.)—Male, Hindoo, aged eighteen years. Left axillary bubo. Vomiting and delirium troublesome. Secondary pneumonia, and rise of temperature to 106°. Admitted on fourth day of the disease, and discharged, cured, thirty-five days later.

CASE II. (Register No. 981. Death after rise of temperature to 107.8°.)—Hindoo, female, aged fifteen years. Right axillary bubo. Much delirium. Some bronchitis. Admitted the seventh day of the disease, and died eighteen hours after admission. Temperature just before death, 107.8°.

CASE III. (Register No. 951. Death after rise of temperature to 108°.)—Hindoo, female, aged eighteen years. Left axillary bubo. Much vomiting. Excessive delirium. Albumin in urine. Bronchopneumonia and rise of temperature just before death to 108°. Admitted on the sixth day of disease and died twenty-eight hours after admission.

Perhaps the sole characteristic common to the majority of temperature-charts of plague is a marked irregularity in the curve. There is very commonly a tendency to a morning fall and an evening rise in temperature, but rises and falls in temperature may occur at any period of the day. Sometimes it is possible to trace the rise to some definite cause, such as the onset of secondary pneumonia or the occurrence of suppuration in the bubo, but quite as commonly a rise in temperature may occur without any obvious cause. Sudden falls of temperature, equally without apparent reason, are by no means uncommon, and may occur at any hour of the day. A fall of some degrees on the second or third day of the attack is not infrequent, and has been regarded by some as a feature characteristic of the disease; it is, however, very often absent. In some cases falls of temperature can be definitely traced to a cause, such as the occurrence of collapse from heart failure, but in a large number of cases no obvious cause can be discovered. A knowledge of this fact is of importance in judging of the efficacy of certain forms of treatment, as it is quite possible that falls of temperature ascribed to the particular form of treatment would have occurred under any other treatment or with no treatment at all.

At the same time there is no question that high temperatures in plague can, with very considerable ease, be artificially reduced by appropriate remedies, such as antipyretics, the hot- or cold-pack, and diaphoretics. In view of the facts above stated as to the relation of the height of the temperature to the severity of the disease, it seems a rational plan to endeavor to reduce the temperature when it rises to a dangerous height. The method may not, perhaps, be based upon quite faultless reasoning, for it may, with full justice, be argued that the high temperature which is so frequently followed by death is not in itself the danger or the cause of death, but merely an index of the tissue and other changes resulting from the action of the toxins or bacilli, or both, circulating in the blood, and that merely to reduce the temperature is not to strike at the cause of the disease. But, on the other hand, it will be found in practice that an artificial reduction of temperature does not only relieve the patient from much suffering, but also appears to in some degree influence the course of the disease for good. The method I have most usually employed is the administration to any patient whose temperature rises above 104° of fifteen grains of phenacetin dissolved in hot rum and water; immediately after the dose the patient is placed in the hot-pack, and perspiration may be further encouraged by a dose of spirit of nitrous ether. Any depressing effect which the large dose of phenacetin might have had appeared to be counteracted by the hot spirit in which it was given. The hot-pack was invariably used in preference to the cold, and I have no personal experience of the effects of the latter. The indications of the disease would certainly point rather to the use of the hot- than of the cold-pack. The skin is usually excessively hot and dry, the functions of the sweat-glands are inhibited, the internal organs are frequently congested, and the kidneys more or less affected, if not in a condition of nephritis. Under these conditions, with an overwhelming quantity of toxins or bacilli, or both, circulating in the blood, it would appear most desirable to encourage in every way the action of the sweat-glands, and the application of an ice-pack would seem, *à priori*, to be fraught with no little danger. No doubt a more rapid reduction of temperature can be effected by the latter method, and it is right to add that in some other hospitals, notably in the Arthur Road Hospital, Bombay, the cold-pack was almost invariably employed, and, it was stated, without any unfavorable results. Native plague patients, however, greatly dislike this form of treatment, and unless very clear benefit can be proved to have been derived from it, this fact may well be taken into consideration, and the patient spared such unnecessary discomfort as the application of an ice-pack implies.

Fears have been expressed as to the wisdom of reducing a high temperature in plague by artificial means, as in the course of the disease the sudden falls of temperature which occur independently of treatment are by some regarded as of unfavorable prognostic import. I am far from feeling sure that such falls of temperature are rightly so regarded. In a disease such as plague, where the mortality ranges between 70 and 90 per cent., and death is therefore the rule rather than the exception, it is easy to regard almost any indifferent but fairly common feature of the disease as of unfavorable import, and this has, I think, been the case in regard to falls of temperature. Such falls certainly occur in cases which recover, and unless the fall is very great, and the result of some obviously unfavorable cause, such as collapse from sudden heart failure, there would seem to be no reason to regard falls of temperature as of necessity bad prognostic signs, or to refrain from producing them by artificial means.

Occasionally a very extreme fall of temperature, accompanied by an excessive degree of collapse and heart failure, is recovered from. The following is the most remarkable instance of the kind that has come under my own observation.

CASE IV. (Register No. 917).—Hindoo, male, aged twenty-seven years. Admitted to the Parel Hospital, Bombay, March 19, 1898, with a history of two days' illness. The case was a fairly typical one of plague, with right axillary bubo. There was troublesome vomiting. The urine was free from albumin. On March 21st the temperature at 6 P. M. was 103°. At 8 P. M. I was hurriedly summoned to the ward by an attendant, who reported that the patient had thrown himself out of the window. This was easily proved to have been impossible, and what had obviously happened was that the patient had got out of bed, had descended a steep staircase which was quite near the ward, and, after walking some little distance along a veranda on the ground floor, had collapsed from heart failure. Almost immediately after he was missed, and on search being made he was found lying where he had fallen, on the veranda. He was removed to bed, where I found him deeply collapsed, quite unconscious, pulseless, and to all appearances moribund. The temperature had then fallen to 98.4°, and at 6 o'clock the next morning it was only 95.8° (or 7.2° lower than it had been on the previous evening). The treatment was confined to the free exhibition of stimulants and the application of warmth, and, contrary to all anticipations, he began rapidly to improve from the time of the *contretemps* described. There were five loose motions during the night. At 9 o'clock next morning he was conscious and answered questions rationally, but had no recollection of the previous night's incident. The tongue was cleaner, but very pale; the pulse was extremely weak, the speech slow and thick, the vomiting had ceased and did not recur; the urine was still free from albumin; there was some cough, but the chest was normal. On the following day (March 23d) the general condition was greatly improved and the pulse much stronger; the temperature varied between 96.4° and 98°. On the 24th the bubo in the right axilla had completely disappeared. Convalescence was uninterrupted, and the patient was discharged, cured, on April 12th.

In cases which recover, the temperature falls to the normal gradually in the course of two, three or more days, rather than suddenly; in other words, resolution of the disease is usually by lysis and not by crisis. Occasionally, however, recovery is preceded by what appears to be a critical fall of temperature. Convalescence may be interrupted by more than one rise of temperature, due either to some obvious cause, such as the appearance of a fresh bubo, or the onset of some intercurrent affection, or due to some cause which baffles all efforts to discover. In malarial subjects suffering from plague repeated rises of temperature may occur throughout the illness and well on into convalescence, and in such cases the temperature-curve may be of a somewhat puzzling character unless the possibility of malaria be remembered.

THE ALIMENTARY SYSTEM. The state of the *tongue* in plague varies very considerably. Perhaps the commonest and most characteristic condition met with is one in which the dorsum of the tongue is loaded with a white or grayish-white fur. This coating of fur is usually dry on the surface; sometimes it is remarkably smooth, and when the smooth fur is, as it occasionally is, moist on the surface, the tongue may present an appearance somewhat remotely resembling mother-of-pearl—an appearance which some observers have described as characteristic of the disease. However thick the fur may be on the dorsum, it is very noteworthy that the tip and edges are, in the great majority of cases, clean, pink, and free from fur. The edges of the tongue are very frequently indented by the teeth.

While the characters just described may be regarded, for convenience sake, as those most typical of the tongue in plague, it is of great importance to remember that in a very large minority of cases the tongue may be absolutely atypical. In not a few cases the tongue is remarkably little affected and only covered with a very thin coating of white or yellowish fur, through which the papillæ may be very clearly visible and apparently unusually prominent. In a rather larger number of cases the tongue is covered with a thin, dry, light-brown, quite glazed and shiny coating, and presents no feature in common with the so-called typical tongue, except in the freedom from fur of the tip and edges.

The degree of coating of the tongue does not appear to bear any very close relation to the severity of the attack. A heavily furred tongue is often met with in patients who ultimately recover and a lightly furred tongue in the most severe and fatal cases. The brown and glazed tongue more often than not indicates a severe attack; it is apt to pass on into the "typhoid" tongue, which will be referred to later, and this is usually accompanied by a general typhoid condition, from which patients rarely rally. In a few cases in which diarrhœa was a prominent symptom, either during the acute period or in convalescence, the tongue was moist, bright red, glazed, and appeared to be to some extent denuded of epithelium.

One of the most highly characteristic features of the tongue in plague appears to me to be the very marked and rapid changes which it may undergo. A tongue which to-day may be typical may be quite atypical to-morrow, and *vice versa.* A thick coating of fur may almost completely disappear in twenty-four hours, and it may again appear in the course of another twenty-four hours. Sometimes the thick fur on the dorsum becomes brown and glazed in patches. A common occurrence is for the white-gray fur on the dorsum to dry up and become brown on each side, but not in the middle, which remains white or gray; the tongue has in such cases five distinct zones from side to side—viz., pink edge; dry, brown, and caked fur; white or gray centre; dry, brown, and caked fur; pink edge. This change seemed to be a very common and characteristic one. Rather less commonly it is the centre zone which turns dry and brown, leaving lateral zones of gray and white.

When the disease terminates in recovery, the tongue clears slowly or peculiarly rapidly. In the latter event, the fur, with or without a preliminary change to the dry, brown, and caked condition, may peel off in quite large flakes, which leave behind them pink, moist, rather raw-looking patches. This rapid peeling of the tongue in flakes cannot, unfortunately, always be regarded as forerunning recovery. It may occur in the acute period as one of those sudden and apparently inexplicable changes which, as just stated, are characteristic of the disease. It may even precede death by only a few hours. In a severe case which will be quoted later (Case XI. of this paper) the tongue cleared in this way on the seventh day of the disease, with no real improvement in the patient's condition, and the patient died eight days later. In the following case the tongue, which had been "typhoid" in character, was peeling in large flakes at the time death occurred.

CASE V. (Register No. 850.)—Christian, male, aged twenty-three years, admitted March 13, 1898, with a history of eleven hours' illness. The temperature on admission was 105.2°; the tongue was coated with a thick, white fur. There was a left axillary bubo, and six days later a left inguinal bubo appeared. There was some vomiting, which yielded to treatment, on March 16, and on the 17th the tongue was cleaner. On the 20th (a fresh bubo having appeared on the 19th) the tongue was dry, caked, and cracked, and dry sordes had collected around the teeth. On the 22d the pulse was very rapid (164) and weak; there was great emaciation and pallor. There were profuse moist sounds over the lungs. The urine was free from albumin throughout. On the 23d the tongue was very dry, caked and brown, and the general condition was typhoid, though the pulse was slightly better. On the 24th the patient was extremely weak; at 9 A.M. the respiration was 64 and very shallow; the pulse was almost imperceptible. The patient was semi-conscious. In spite of this hopeless condition the tongue was clearing, the fur peeling off in thick flakes. Death occurred less than two hours later (at 10.50 A.M. on the 24th).

Many plague patients pass into the typhoid state, the tongue in such cases becoming caked and brown, as in the case just quoted, and the lips and gums covered with sordes, either dry and caked or viscid and tenacious in character. The prognosis in such cases is practically hopeless. I have not preserved notes of a single case in which recovery from this condition ensued, nor can I recall such an occurrence.

Tremulousness is a character of the tongue which is very far from uncommon in plague. It is to be regarded rather as an indication of the general muscular weakness which characterizes the disease than as a feature special to the tongue. Very often the patient is apparently unable to protrude the tongue through sheer exhaustion, while in a still larger number of cases the tongue cannot be examined, owing to the mental condition of the patient, which prevents him or her from understanding what is required.

Vomiting. At some period of the disease vomiting is unquestionably a common accompaniment of plague—quite common enough to make it rank among the diagnostic symptoms of the disease. In going through the case-sheets of 502 patients I find that vomiting is recorded in only 68 instances. I am quite convinced, however, that this does not represent a true proportion of the cases in which it was present. In some instances it doubtless occurred in hospital, and escaped being entered on the case-sheet, while in still more I have little doubt that there was vomiting before admission, or soon after the onset, and that it had escaped record.[1] I have formed this opinion principally from the fact that in cases, both in Bombay and Calcutta, where I was able to take the history myself, vomiting was, with rare exceptions, found to have occurred.

Vomiting is usually an early symptom, and in not a few cases it is the very earliest symptom of all, preceding by a short interval the onset of the "initial" rigor and headache. On the other hand it may, and not infrequently does, occur at later periods, either during the acute stages or in the course of convalescence. It would appear in very many cases to be of cerebral origin, the vomiting occurring independently of food, and retching continuing long after the stomach is emptied. In a few cases it will be found to be very persistent and difficult to control; but, as a general rule, the vomiting of plague is not a very troublesome symptom. It can generally be checked by the ordinary remedies, such as ice to suck, sinapisms and poultices to the pit of the stomach, and the usual internal anti-emetics. Sedatives and hypnotics are almost invariably required to control the mental and nervous symptoms which are so prominent in plague, and these will generally be found useful in checking the vomiting, particularly when it is of cerebral origin. The exhaustion caused by excessive vomiting is so great that the symptom should, if possible, be checked and controlled from the beginning.

---

[1] I am desirous to avoid any appearance of charging the native hospital assistants (who usually took the history of the cases) or the nurses with carelessness or neglect. One and all were most zealous in the performance of their very trying duties. It is always difficult to obtain an accurate history from a native patient or his friends.

Hæmatemesis is said to occur with some frequency in plague. I have observed it in two cases only. In both it occurred very shortly before death.

The state of the bowels in plague is usually, but not invariably, one of constipation. This is probably due in part to a diminished activity of the intestinal glands. All glandular structures in plague appear to have their secretory functions either diminished or inhibited altogether. This is particularly marked in the case of the sweat-glands, which, in the majority of cases, are almost completely inactive, the skin becoming in consequence excessively hot and dry. The action of the kidneys is, in like manner, very frequently interfered with, and the amount of urine markedly diminished. In some cases considerable sluggishness of the bile-secreting functions of the liver is indicated by the color of the stools. The salivary and lingual glands are similarly inactive, with consequent dryness of the tongue and mouth. It is only reasonable to suppose that the intestinal glands share in the general inactivity, and that the constipation is largely a result of this. Equally probable the constipation is favored and increased by the muscular weakness and paresis, which would seem to be common to all muscular structures, whether striped or non-striped, throughout the body, and which is doubtless due in part to the direct action upon the muscular fibre of toxins circulating in the blood, and in part to their indirect action through the nervous system. The constipation of plague should always be relieved. The majority of patients received, on admission to hospital, either a large dose of calomel or an ounce or more of castor oil. Considerable relief, if only temporary, is afforded to many of the symptoms by thoroughly cleaning out the alimentary canal.

While constipation is the rule in a typical attack of plague, cases in which diarrhœa occurs are by no means rare exceptions. It may be present either during the acute period of the disease or during convalescence. Occasionally it is somewhat persistent and a cause of some delay in the recovery of a patient; but, as a rule, it is checked without much difficulty by the ordinary remedies for diarrhœa. If only slight, it is unnecessary to check it, and, perhaps, unwise to do so, particularly in the acute stage, when its eliminating action may possibly be of value. But if at all troublesome it should be controlled, as, if unrelieved, it can only still further weaken a patient already prostrated by one of the most exhausting of all diseases.

A loose motion or series of loose motions may occasionally occur just as the acute symptoms are passing off in a case which is going to end in recovery, and in such cases they may be regarded as critical evacuations. This was the case in the patient whose history has already been given (Case IV. of the present paper). There, it will be remembered, the extreme fall of temperature which followed his adventure was accompanied by five loose motions, and the patient from that time onward progressed to an uninterrupted recovery. Diarrhœa sometimes occurs before death in fatal cases, and the involuntary passage of a loose stool or a succession of loose stools is a not at all uncommon precursor of death.

The frequency of round-worms in both stools and vomit of native plague patients in India deserves mention. It is of little clinical import, but it is well, particularly in children, to give an anthelmintic and clear the bowels of these and other parasites. The measure has little obvious influence on the course of the graver disease, but it can but be right to remove so powerful a source of nervous irritation as worms are known to be.

Hemorrhage from the bowels did not occur in a single instance in the plague cases I have seen, or if it did occur, it was never sufficiently great to be observed by the nurses or ward attendants, who would certainly have called attention to it. A small amount of blood in a stool may, in some instances, have escaped notice. After death hemorrhagic patches in the mucous membrane of the stomach and intestines are far from uncommon, and it is beyond question that in some cases blood may escape into their lumen. But, as just stated, it never did so to an appreciable extent in the cases under my care, and, so far as my experience of plague is concerned, both in Bombay and Calcutta, it does not support the opinion expressed by so many of the older writers upon plague, that the passing of blood from stomach and bowel is a common symptom of the disease.

Physical examination of the abdomen rarely shows any marked or characteristic deviation from the normal. The liver is occasionally enlarged, but seldom to any great extent. I have never seen jaundice complicating plague, but some degree of icteric tingeing of the conjunctivæ is very common. It is often masked, however, by the deep injection of the conjunctival vessels, which is so common in plague. Local abdominal pain or tenderness is not a feature of the disease, but when the deep iliac glands are enlarged, as they frequently are in addition to the superficial inguinal glands, then there may be much pain and tenderness over the lower part of the abdomen. The state of the spleen will be discussed under the hæmopoietic system.

That the alimentary canal shares in the effect of the general toxæmia of plague is shown by the post-mortem appearances. As already stated, hemorrhagic patches, either pinkish-red or more dusky and purple in color, are met with in the mucous membrane of the stomach and of the small and large intestines. More commonly they are seated just under the serous coating of these organs; they vary in size from mere points up to patches the size of a sixpence or larger. Peyer's patches and the solitary glands rarely show any change from the normal, except a tendency to be rather more prominent than usual. The liver is frequently quite normal in appearance, but in some instances it was found rather enlarged and much congested. Hemorrhages are frequent in the peritoneal covering of the liver, and particularly along the line of reflection of the falciform and other ligaments, where dusky purple or pinkish patches are very common. The liver, on section, has often a peculiarly shiny and glazed appearance; it is frequently deeply engorged with blood, and occasionally minute red points are seen scattered over the surface, which appear to be punctate hemorrhages into the substance.

The Nervous System. Almost from the first the nervous system is more or less profoundly affected in plague. In this respect, as in others, the analogy of plague with typhus fever is striking. It would seem that the plague toxins circulating in the blood, while affecting in some degree every system and tissue in the body, have a specially intense action upon the entire nervous system, both cerebro-spinal and sympathetic. This is indicated by the headache and giddiness which accompany the outset; by the extreme degree of physical prostration and weakness which characterize the later stages of the disease; by the mental phenomena, such as apathy, delirium, drowsiness or coma, which are rarely absent; by the convulsive and paralytic symptoms which occasionally occur; by the mental changes which are sometimes left as one of the most unfortunate sequelæ of plague; and by the trophic manifestations which are common accompaniments of the disease.

At the time of onset some degree of *headache* is almost always complained of; it is most usually frontal, and is quite as commonly bilateral as unilateral. In many patients it is extremely severe, and appears to cause more suffering than any other symptom. It is usually accompanied by a greater or less degree of giddiness, and, as stated before, by nausea or vomiting. Aching of the back and limbs is also in some instances complained of.

Some degree of *physical prostration and weakness* is present in almost every case of plague, and more often than not it is present in an extreme degree. The voice becomes weak, the muscles flaccid, and the patient appears thoroughly prostrated. In many patients this appearance manifests itself from the very beginning. Occasionally, however, during the first two or three days of the illness a patient may show little signs of weakness or depression of vital powers, and, although admittedly ill, and willingly confined to bed, may retain a strong natural voice, a general appearance of health, and an almost normal degree of muscular strength and bodily energy. Unfortunately, such cases are often cruelly deceptive. A change for the worse may set in at any moment, and in the course of a single hour a patient who may have buoyed himself with the hope that he was suffering from that delusive thing " a mild attack of plague," may be delirious, prostrate and almost moribund. A " mild attack of plague " is indeed a contradiction in terms. No case in which the diagnosis of plague is certain, however apparently " mild " it may be, can be regarded without grave apprehensions for the result until convalescence is thoroughly established.

The *mental condition* of plague patients varies greatly. Very few of those admitted to hospital are entirely free from some departure from the normal in their mental state. Apathy and indifference to their surroundings are very common symptoms. Some degree of drowsiness, passing on in not a few to complete coma, is equally frequently met with. Many such patients seem to desire nothing more than to be left alone and undisturbed. They lie either supine or upon one side, and may appear to be enjoying quiet and normal sleep. But they are not sleeping—they are in a state of what is apparently complete mental and physical inertia. They can easily be roused, and appear to understand more or less clearly what is said to them, and may tardily comply with requests (such as to put out the tongue), but they resent all interference, and after giving monosyllabic replies to questions, or no replies at all, at once relapse into their former attitude and lethargic condition.

The more or less sudden changes, already referred to more than once as common in this disease, very frequently supervene on the condition just described; and it is no uncommon thing for a drowsy and lethargic patient to suddenly become noisily delirious, or for one who to all appearance had lost all muscular strength and energy suddenly to develop an almost maniacal strength and to require several persons to aid in holding him or her in bed. Such accessions of strength rarely last very long, and the patient generally, after a longer or shorter period, relapses into the lethargic state, to all appearances more prostrated than ever.

Some degree of delirium is among the commonest of mental phenomena in plague. It may be present in any degree, from a mere occasional incoherent or irrelevant remark up to the most alarming form of maniacal delirium. In the acute stages of the disease it is, perhaps, more often than not a noisy, talkative form that the delirium assumes. Delusions, illusions and hallucinations are all met with in this period of the disease, and these may either be of an unpleasant or terrible character, causing the patient much suffering and fear, or they may be pleasant and agreeable in character, the patient in such cases smiling and laughing and showing every sign of enjoying the scenes and surroundings which his disturbed brain has conjured up. In the noisy form of delirium patients almost invariably attempt to get out of their beds, and it is often only with the greatest difficulty that they can be prevented from doing so. In view of the extreme danger of a sudden change to the upright position and sudden exertion on the part of plague patients being followed by heart failure, collapse and perhaps immediate death, it is of the utmost importance to guard against this risk. In the Parel Hospital every patient as soon as he or she showed any sign of mental change was at once tied in bed by means of soft bandages, and strict instructions were, of course, given to nurses and attendants to prevent patients from suddenly sitting up or getting out of bed for any purpose whatever. In the apathetic state the majority of patients showed little objection to their arms and legs being tied; while as regards patients in the noisily delirious state, though many strongly objected to the process, and fought and struggled to get rid of their bonds, it was absolutely necessary, for every reason, to tie them in bed. Without some such measure the wards and corridors of the hospital would at times have been thronged with wandering, delirious and perhaps maniacal patients, who appear to prefer any place to their own beds. In no instance was any injury produced by the bandages; while it may with safety be claimed that many lives were saved by the precaution. But, with all our precautions, it was not possible to prevent some unfortunate accidents, and more than one patient suddenly sat up in bed and as suddenly collapsed from cardiac failure.

While a noisy, talkative delirium is the form rather more commonly met with, a low muttering delirium is far from infrequent. The one form may, and often does, pass into the other, particularly in the later stages of the acute period. This form of delirium is a very common accompaniment of the typhoid state into which many patients fall. Such patients usually lie on their backs, their tongue and mouth in the condition already described as characteristic of this state; they are unconscious of their surroundings, they mutter incoherently either continuously or at intervals; they frequently pluck at the bedclothes; and involuntary evacuations of both bowel and bladder may occur. Death almost invariably ensues at no long interval after the patient has fallen into this condition.

The delirium can in many instances be checked by appropriate remedies. The bromides are sometimes sufficient by themselves. They may be aided or replaced by chloral hydrate, by opium and its derivatives, by sulphonal or paraldehyde. The noisy form of delirium must be checked, if possible, in hospital patients, as much for the sake of others as for that of the patient himself. Frequently it is necessary to give large and repeated doses of morphine or other sedative to quiet a noisy patient. The injectio morphiæ hypodermica is the most useful form of administration, in doses of 2 or 3 minims. Sulphonal, in doses of 15 grains, also proved a valuable remedy, given either at night only or night and morning.

Many patients pass into a condition of more or less complete coma. In most fatal cases the patient becomes unconscious for some hours before death. The coma which precedes death may be accompanied by the typhoid state already described, or it may be associated with Cheyne-Stokes breathing; with stertorous respiration; with *risus sardonicus* and other convulsive symptoms; with relaxation of the sphincters; with the state known as coma vigil, or with two or more of these symptoms.

Convulsions are not infrequently met with in plague patients, and some observers have proposed to make a convulsive type of plague. The spasms may be unilateral or bilateral. Sometimes they appear to involve every muscle of the body Opisthotonos may occur. The spasms may be either tonic or clonic, or first one and then the other. They may come on quite suddenly, without any apparent cause; in one case, quoted below, they developed after an accident to the patient, who fell out of bed and badly bruised her head If the convulsive seizure is at all severe or prolonged, consciousness is lost, and the attack resembles in every respect an epileptic fit. The attacks may be repeated several times at short intervals, or even for a day or more. In one case convulsions occurred at intervals varying from a few minutes up to three or four hours for three successive days before death. But more often the great exhaustion caused by the spasms seems to hasten death, and patients rarely survive severe or repeated convulsions for many hours. The second of the two following cases was the only one I have seen in which severe convulsions were survived for a considerable period, and in which, though death subsequently occurred, it was not in any way hastened by the convulsions.

CASE VI.[1] (Register No. 838).—Female, Hindoo, aged twelve years, admitted to the Parel Hospital, Bombay, at 1 A.M. on March 12th, with a history of five days' illness, characterized by rigors, coughs and fever, and by diarrhœa for the two days previous to admission. On admission the temperature was 100°; the skin was hot and dry; the tongue was thickly furred; the conjunctivæ lightly injected; pulse small; lungs normal; there was a right inguinal bubo. During the morning of the day of admission the patient appears to have fallen out of bed. A large hæmatoma developed on the forehead, and severe convulsions set in. At 3.30 P.M. the following note was made: "The patient is convulsed and unconscious; the pupils are widely dilated and inactive. There are frequent tonic spasms of the whole body, going on to opisthotonos; the legs are widely extended, the arms are flexed and the hands clenched, and there is grinding of the teeth. The rigidity lasts about two minutes and is succeeded by clonic spasms of the whole body. The urine is passed involuntarily. The temperature is 105°." Death occurred five minutes after this note was taken.

---

[1] This and all other female cases were under the care of Miss Corthorn, M.D., for the greater part of the period during which I was in charge of the Parel Hospital. I gladly acknowledge her courteous permission to make use of the notes of her cases.

CASE VII.—E. G., male, Madrassee, native Christian, aged eleven years. The boy returned from Madras, where he had been living for some months, to Calcutta on February 27, 1899. He remained well until March 12th, when he was seized with vomiting, high fever and delirium. I first saw him on the afternoon of March 14th. He was then semi-conscious; the temperature was 102.8°, pulse 144, respiration 50. The conjunctivæ were deeply injected. In the right groin was a tender bubo the size of a walnut; vomiting was very troublesome, nothing being retained. There was some cough, but no expectoration. During the day he had been repeatedly convulsed. An attack occurred before I left the house. The spasms were bilateral, clonic, and general throughout the body; there was slight opisthotonos, the pupils were dilated, and the tongue bitten. The patient was removed to the Medical College Hospital, where he was under the care of Captain Bird, I. M. S. He lingered on for thirteen days, and died on March 27th of secondary pneumonia and exhaustion. The convulsions ceased at no long interval after admission to hospital, but I have, unfortunately, no note of the exact day and hour at which they ceased. The survival of this patient for so long a period was as remarkable as it was unexpected. His condition when seen by me on March 14th was so grave that I had much hesitation in ordering his removal to hospital, as I feared he might not survive the journey.

Sometimes a local spasm of a muscle or a group of muscles is met with. In one case the spasm was confined to the facial muscles of the left side. In another it occurred in both hands. The contraction of the facial muscles, which causes the appearance of *risus sardonicus*, is by no means uncommon. Such partial or local spasms are apt to occur during the last stages of fatal cases, within the last few hours preceding death; in the actual throes of death local and general spasms are very frequently observed. Nystagmus was present in one case; the patient was a Hindoo female, aged eighteen years, who had a fairly typical attack of plague, accompanied by a right axillary bubo and vomiting; she recovered. The following are notes of a case in which there were bilateral spasms affecting the same group of muscles on each side:

CASE VIII. (Register No. 863).—Muhammadan female, aged twelve years, admitted to the Parel Hospital at 9.30 A.M. on March 15, 1898, with a history of illness commencing with rigor on the previous evening. On admission the temperature was 104.2°, pulse 132. There was extreme drowsiness; in the right groin was a tender bubo. At 2 P.M.

on the day of admission there were slight convulsive movements of both hands, the thumbs were bent in on the palms, and the fingers were extended. The pupils were contracted. Death occurred at 1 o'clock on the following morning.

Hiccough is not very rarely met with in plague. It is a symptom of very grave import; if at all prolonged, the exhaustion which it causes appears to hasten death. It can sometimes be checked by appropriate remedies; but it is apt to recur and persist, refusing to yield to all treatment until death. The following are notes of a case of this kind (in Case XI. hiccough was also present, but it was easily controlled, and, though death occurred, there is no reason to suppose it was hastened by the hiccough):

CASE IX. (Register No. 818.)—Goanese male, Christian, aged twenty-one years. Admitted to the Parel Hospital on March 8, 1898, at 9.15 A.M. The attack had commenced at midnight, with fever, and pain and swelling in the left groin; there had been slight headache; no giddiness. On admission the temperature was 100°; the pulse was fairly full, but soft and compressible, 112 per minute. The patient was quite conscious; the speech was clear, the voice strong, and the patient, who was of unusual muscular strength and development, showed little appearance of being ill. The tongue was lightly coated with white fur, slightly tremulous, pink and clean at the edges. There was a slightly tender bubo, of the size of a walnut, in the left femoral region. On the 8th, 9th, and the morning of the 10th of March the patient's condition remained excellent; the pulse was fairly strong; there was no vomiting, and no delirium or other mental symptom; but on the afternoon of the 10th a change for the worse suddenly set in, and at 6 o'clock hiccough commenced and became very troublesome. It was kept in check by the sucking of ice, the application of sinapisms, and the exhibition of morphia, bromides and tincture of capsicum. At midnight the temperature was 103°, pulse 100, and respiration 36; there was some delirium, and the general condition was markedly worse. He slept but little during the night. At 6 A. M. on March 11th he was still delirious; the pulse was becoming weak; the hiccough had returned. There was a rapid increase in the general weakness; the pulse became very small, and the patient sank, and died at 9.15 A.M. There seemed little room for doubt in this case that the hiccough hastened the end.

Paralytic affections are also met with in plague. The general weakness or paresis of muscular structures throughout the body which characterizes the acute period has already been referred to. It would appear to be, in all probability, in part the result of a direct action upon the muscular fibres of the toxins circulating in the blood. True paralysis of any muscle or group of muscles, of clearly nervous origin, and pointing to the presence of some lesion in either the cerebral cortex or some part of the motor tracts, I have never seen in plague. Such paralyses are said to occur in the disease, and other observers have reported the occurrence of paraplegia, hemiplegia, or monoplegia, either as accompaniments or sequelæ of an attack of plague. They were not, however, present in a single case that came under my care. A marked degree of weakness, amounting to paresis, but not to a complete paralysis, of all the systematic muscles is occasionally left after a very severe and prolonged attack of the disease, and this is usually accompanied by an equally severe change in the mental condition of the patient. The following case is a characteristic example of this condition :

CASE X.—Male, Hindoo, aged eighteen years. This patient was in the wards at the time I took charge of the hospital. He had passed through a severe attack of plague, and was then " convalescent." For the following eleven weeks he lay in bed, aphasic, apathetic, and entirely indifferent to his surroundings. For the greater part of the time he was unable to walk or stand alone. Toward the end, as the result of persistent practice and massage, the muscles gained strength, and he could stand and even take a few steps without support. Much of his inability to walk or stand was unquestionably due to mere stiffness and want of use of the muscles and joints from his prolonged confinement to bed ; but much of it was also due to a real paresis of the muscles, and not a little of it was the result of his mental condition.[1] His mental state seemed to have returned in many ways to that of an untaught child, and he appeared to require to be taught how to walk over again, just as he required to be taught talking and habits of cleanliness. He occasionally, and at one time frequently, passed his motions and urine in bed, apparently from indifference as to the results rather than from any paralysis of the sphincters. He suffered throughout from a succession of pemphigoid bullæ in various parts of the body, which burst or were opened, and left rather slowly-healing ulcers. There was considerable wasting, and in general his state as regards tissue-nutrition appeared to be at a very low ebb. He took food, however, well, and there was no disturbance of the digestive organs. His mental and bodily condition very slowly improved. Toward the end of the period he appeared to understand what was said to him and attempted to speak ; his lips appeared to form words, but he was unable to produce any sound above the faintest whisper, and it was impossible to tell whether the movement of the lips was an attempt to form intelligible words or mere meaningless sounds.

Among paralytic symptoms may be mentioned the occurrence of ptosis, on the left side in one case. Paralysis of the sphincters, with consequent passage of the motions and urine in the bed, frequently occurs in the late stages of the acute period in fatal cases.

Affections of the speech, though not always of paralytic origin, may be conveniently dealt with here. Some interference with speech is one of the commonest and most striking features of plague. In the acute stage of the disease, before delirium has set in, the speech is, in the large majority of patients, slow, hesitating and peculiarly " thick " in character. In very many patients the speech resembles exactly that of a person in the early stages of alcoholic intoxication, and the term "thick," so often applied to the speech of a man who has taken more drink than is good for him, expresses more nearly than any other word the character of the speech most commonly met with in plague patients. Not infrequently there is some degree of "scanning" in the speech; but most commonly the words are imperfectly pronounced, and there is a tendency to slur over syllables, particularly at the end of words. The interference with speech at this period appears to be due in part to the muscular weakness which affects the tongue, just as it affects all the other muscular structures, and, in part, to a certain loss of co-ordinating power. That the co-ordinating centres in the cerebellum are disturbed is indicated by the character of the gait in the early stages of plague. If the patient attempts to walk, he rolls from side to side, exactly like a drunken man, and in a manner which is evidently in part due to muscular weakness and in part to loss of co-ordinating control. These two factors would appear sufficient of themselves to account for the character of the speech in the early stages of the disease, though possibly even at this early period the centres for speech are, in common with most of the higher cerebral centres, suffering from some degree of functional disturbance caused by the action of the toxins circulating through them.

---

[1] There were, unfortunately, no means for testing the electric condition of the muscles.

In the more advanced stages of the disease the affections of speech would appear to be of twofold character: First, affections due to local disturbances of the mechanism of speech; and, second, those caused by central nervous disturbances. Among the local causes which interfere mechanically with speech is the condition of the tongue. This organ is occasionally so coated with brown, dried and caked fur as to be practically useless for the formation of words, and in this state, if the patient's mental condition permit him to speak, his speech may be almost incomprehensible from the unpliable condition of the tongue. The muscular weakness already mentioned persists in this later stage, and continues to increase, and in not a few cases the exhaustion is so great that the patient seems to lack muscular strength sufficient to move tongue and lips to form words, or to vibrate the vocal cords and produce sound. In patients with large buboes in the cervical region speech may be mechanically interfered with in more than one way. In its least serious form the interference with speech is the result merely of some stiffness and difficulty in opening the jaw, owing to involvement of the parotid gland on one or both sides. In such cases the speech is exactly like that of a person suffering from mumps, and for exactly the same reason. In more serious cases there may be widespread infiltration and œdema around and beneath the cervical tumor, extending to and involving all the deep structures of the neck, including the pharynx, base of the tongue and the glottis itself. In this condition not only is speech almost impossible, but respiration may be dangerously obstructed. Not infrequently, in cases with cervical bubo, the attempt to bring into action the muscles of speech is so painful that the patient, though able to speak, naturally shrinks from doing so.

The speech affections of central nervous origin in plague require closer investigation than they appear as yet to have received. It was pointed out above that the indistinct speech met with in the early stages of the disease may possibly be the result of some functional disturbance of the higher speech centres. In the later stages there would appear to be in many patients a more profound disturbance of these centres, and in a few cases this may be of a lasting or possibly of a permanent character, leading to a more or less prolonged or to a permanent condition of aphasia. Serious speech affections of this nature appear to be generally associated with more or less profound changes in the patient's mental condition, and in the few cases I have seen in which aphasia was continued throughout convalescence there was serious mental change of the nature either of imbecility or of a return to the mental condition of childhood. On the other hand, such serious mental changes may follow an attack of plague without being accompanied by true aphasia.

In what proportion of cases the absence of speech which is met with in many patients in the lethargic period of an attack of plague is due to a disturbance of the nerve centres, and, therefore, a true aphasia, it is not easy to determine. Many such patients, when aroused from their lethargic state, appear to understand more or less perfectly what is said to them, and may put out their tongue when told to; but they do not reply to questions, and either make no attempt to speak, or, if they do, only utter a faint, unintelligible sound. The true condition of the speech is always masked in these cases by the extreme weakness and by the local conditions already referred to. But it would appear probable that the entire absence of speech in patients at this period is in some instances due merely to lack of desire to speak, either through exhaustion or from the condition of the higher volitional centres; while in others the absence or unintelligible character of the speech is almost certainly the result of some special disturbance of the speech centres. That such disturbance does occur we know from its persistence in a small number of those patients who survive this period and recover; and inasmuch as for every patient who recovers some three or four die, it is only reasonable to suppose that for every patient who recovers with persistent aphasia the disturbance of the speech centres which causes it is present in three or four others who die.

The duration of the aphasic state in patients who recover from an attack of plague appears to vary. Whether or not it is ever permanent I am unable to say. The longest case which came under my own observation was that quoted above (Case X.). In that case aphasia continued for at least eleven weeks, with only some faint signs of improvement during the later weeks. At the end of that period I left Bombay and lost sight of this and of all other patients who had been in the Parel Hospital.

The *changed mental state* (which may or may not be accompanied by aphasia), which is sometimes left behind after an attack of plague, has already been alluded to. Some degree of blunting of the mental faculties is far from uncommon as a sequelæ of the disease. Such patients have usually a vacant expression; they are apathetic and indifferent to what goes on around them; they are slow and perhaps awkward in their actions. Their higher volitional centres appear to be, for the time being, largely in abeyance. Occasionally such patients are peevish or fractious; or they are easily moved to tears on the slightest provocation, or on no apparent provocation whatever. They may be dirty in their habits. One patient of this kind, a male adult, persistently passed his motions on the floor of the convalescent ward he occupied. No amount of exhortation, reproach or punishment would cure him of this habit. He whined and cried like a child when reproved, but invariably repeated the act within the next twenty-four hours. Another case in which there was marked mental change was that of a child, a male Hindoo, aged nine years. He passed through a severe attack of plague accompanied by a right inguinal bubo which ulcerated on the surface, but did not suppurate. During the acute period he suffered from excessive delirium, which appeared to be accompanied by delusions and hallucinations of a painful character, causing the child great fear. He frequently uttered a cry of a curiously metallic character, and there can be little doubt there was some meningeal involvement. During convalescence the mental state was markedly peculiar. He was more or less rational and aware of his surroundings, but at short intervals he would give way to hysterical outbursts of crying without apparent reason. These outbursts were generally accompanied by signs of fear or alarm. Any attempt to examine him always brought on an attack of this kind. He was removed from the hospital by his relatives on the nineteenth day after admission, and was not seen again.

The *reflexes* in plague are almost invariably diminished or lost altogether. This is true of both deep and superficial reflexes, and their diminution or loss is met with not only in the acute period, but also well on into convalescence in patients who recover.

Ordinary *sensation* would appear to be to some extent diminished in the acute period of the disease, either from some changes in the excitability of the sensory nerves or nerve-endings, or more probably from a dulling of the receptive power of the centres for sensation in the brain, or from both of these causes. I have never, however, seen a condition of complete anæsthesia either local or general. The power of feeling pain is also never lost (except, of course, in unconscious patients). This is especially marked in connection with the buboes; these are sometimes very tender, and the slightest pressure on them may cause a patient, even in the most pronounced state of apathy or semi-consciousness, to twinge and show signs of pain.

Retention of urine is a symptom of nervous origin which is extremely common. It, too, may be provisionally explained as due to the dulled receptivity of the sensorium just alluded to, the sensory centres being unaffected or imperfectly affected by even strong afferent impulses, and the patient being consequently unaware of the necessity for evacuating the bladder.

The *cerebral vomiting*, described under the alimentary system, is another symptom of nervous origin which only requires to be mentioned here.

The *organs of special sense* do not escape the action of the plague poison. The eyes in particular are apt to suffer. The degree of affection of the eyes may vary from the slightest amount of conjunctival injection up to inflammation and complete destruction of the entire eyeball. Some degree of conjunctival injection is rarely absent, and, as it is an early and constant symptom, it should always be looked for as an aid to diagnosis. In the majority of cases it leads to no further mischief in the eyes, and disappears as the patient becomes convalescent. But in a small number of cases it leads to a greater or less degree of conjunctivitis, with the usual pain, photophobia, and slight or profuse purulent discharge characteristic of that condition. The onset of conjunctivitis may be insidious and its progress rapid, and the eyes in all plague patients should, consequently, be regularly examined and appropriate treatment adopted on the first appearance of inflammatory signs. In some patients inflammation and ulceration of one or both corneæ develop. This happened in nine out of the 502 cases admitted to the Parel Hospital. Seven of these patients died, but the numbers are obviously too small to base upon them any conclusion as to the prognostic import of this complication. The character of the keratitis and ulceration, their diagnosis and treatment, appeared to differ in no respect from those of the same affections arising from other causes, save that in some of the cases the ulceration developed very rapidly and with apparently no preliminary stage of keratitis. Possibly the ulceration in such cases is a trophic lesion closely analogous to the local sloughings and necrosis of the skin which occur in different parts of the body, and will be described later. Possibly, too, it may be encouraged and favored by that diminished sensitiveness of the afferent nerves and nerve centres already alluded to, which would interfere with the conjunctival reflex and favor the retention of any minute irritant particles which might find their way into the sac. I have never, however, seen a case in which the conjunctival reflex as tested by the finger was lost, except in unconscious and moribund patients.

Some degree of iritis occurred in four cases under my care—two of these cases recovered and the other two died. The iritis may be accompanied by the presence of pus in the anterior chamber. In one patient (who recovered) the iritis was accompanied by the appearance in the iris of a small yellow tumor, about the size of a hemp-seed, which had all the characteristics of a small, localized collection of matter. It was rapidly reabsorbed, and the patient recovered without any sequelæ in the eye. In both this case and in the other case with iritis which recovered a pterygion developed, but was reabsorbed without any after trouble.

In two patients, both of whom died, an acute inflammation of the entire structure of the eyeball developed. It commenced in each with an acute conjunctivitis, rapidly passing on to kerato-iritis, ulceration of the cornea and inflammation of the ciliary body. The inflammation spread rapidly in one case and slowly in the other, and appeared to involve the whole of the deeper structures of the eyeball; the cornea sloughed and perforated, allowing the escape of a mixture of water and pus, the eyes collapsed, and both patients died. In both the condition was bilateral. The following are the clinical notes of one of these patients:

CASE XI. (Register No. 812).—Hindoo, male, aged twenty-one years. Admitted to the Parel Hospital March 6, 1898, with a history of three days' illness. On admission he presented all the appearances of a typical attack of plague. The temperature was 102°, pulse 130 and weak, respiration 32. The tongue was coated with white fur on the dorsum, but clean at the tip and edges. The skin was dry and the conjunctivæ congested. There was some headache; no cough. There was a right inguinal bubo. The notes on the further progress of the case are as follows:

March 6th (afternoon). The patient is very restless, delirious, and at times violent.

7th. The temperature was 99.8° at 5 A.M. and at noon; 101.8° at 6 P.M.; and 103° at midnight. The pulse was 124 at 6 A.M and 152 at 6 P.M.

8th (morning). The conjunctivæ are deeply injected, and the eyelids are glued together with pus; there are signs of commencing keratitis in the eyes. The tongue is coated on the dorsum with a dry, yellowish-gray fur, but pink and moist at the edges. The pulse is 144, irregular, compressible and weak. The respiration is 20, regular and shallow. The patient is drowsy, but at the same time restless and tossing about much, frequently throwing his arms about and turning from side to side. He is able to understand and answers questions, but the speech is indistinct and slow, and he tends to relapse into silence and drowsiness. There is a very tender bubo, the size of a walnut, in the right groin. The urine is acid and contains albumin. The temperature at noon was 98.4°. At 3 P.M., 24 c.c. of Yersin serum were injected in the flank, and this was repeated on the four following days. At 7 P.M. the pulse was 156, very weak and compressible, respiration 30, temperature 103.4°. At midnight the temperature was 102.6°.

9th. The patient slept well. The keratitis is increasing.

10th. The pulse is much better, less rapid and stronger. The tongue is clearing, the gray, dried, and caked fur coming off in flakes. The keratitis is increasing in both eyes. This has been treated from the beginning with atropine drops and irrigation with boric acid lotion and a pressure bandage.

11th. There is nausea and some hiccough, which is controlled by treatment. There is occasional delirium.

12th. The patient slept badly. There is intense conjunctival injection and complete corneal opacity in both eyes. The tongue is much cleaner, but quite dry. The bubo has increased immensely in size, and now measures five by three inches; it is hard and tender.

13th. He was delirious and noisy in the night, but slept at intervals. Albuminuria is still present. The temperature has fallen to 99°.

14th. There is a large central ulcer in the left cornea; vomiting is very troublesome and cannot be controlled by treatment. The temperature was 97° at noon and 98.4° at midnight.

15th. The condition is unaltered, vomiting is still severe.

16th. A diffuse glandular swelling has appeared behind and below the right ear. The vomiting is slightly less severe, but still troublesome. There is constant delirium, and the patient is very restless.

18th. The general condition is unaltered. The bubo in the groin is unchanged, that in the neck is larger and is hard and tender; neither shows signs of suppuration. The patient is very weak, delirious, and restless. There is a condition of panophthalmitis in both eyes. The gums have become soft and spongy, and there is constant oozing of blood from them, the condition closely resembling that seen in scurvy. The patient died at 10.5 P.M. The temperature had been sub-normal (96°) since noon

The local sloughings and necrosis of the skin, to which reference was made above, should, if they are in truth, at least in part, lesions of trophic origin, be described in this place as affections of the nervous system. It will, however, be more convenient to discuss them later, when describing the external local manifestations of the plague.

(To be continued.)

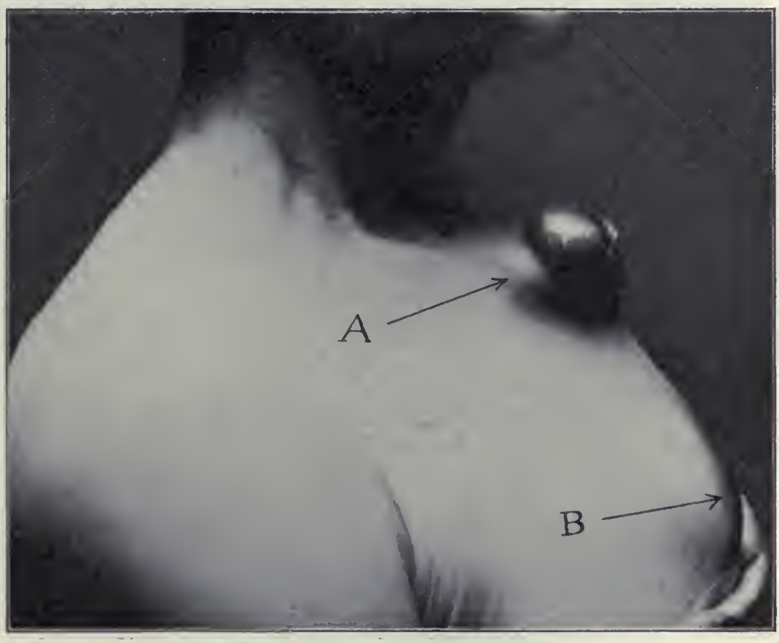
A REMARKABLE CASE OF PROBABLE THORACIC ANEURISM PRESENTING INTERMITTENTLY THROUGH THE STERNUM.

By Richard C. Cabot, M.D.,
PHYSICIAN TO OUT-PATIENTS AT THE MASSACHUSETTS GENERAL HOSPITAL.

In June, 1898, Mrs. H., aged forty-two years, came to the out-patient department of the Massachusetts General Hospital, seeking treatment, as she said, for an *aneurism.* Over the region of the manubrium was a pulsating tumor the size of a lemon, greenish-black at the tip, with a red areola around the black. A systolic murmur could be heard over the tumor. (See Figs. 1 and 2, A.) I was a good deal afraid that rupture might occur then and there, and so without further investigation hurried the patient into the hospital.

There, within a few days, the tumor broke. No blood came out, but only some puriform material. On more careful questioning it appeared that the swelling first made its appearance seven years before, and in the course of a few months attained nearly its present size and characteristics. It was at that time announced by a physician to be an aneurism of the aorta, but under treatment by iodide of potassium (internally) it diminished rapidly in size until no external tumor was visible. The patient had always enjoyed good health, but had a series of seven successive miscarriages. Except for this there was nothing suggestive of syphilis in her history. The miscarriages occurred at intervals of from one to three months after conception. The first appearance of the tumor was attributed by the patient to a strain due to cornet playing. In the course of the last seven years *the tumor has come and gone several times,* becoming more noticeable during periods of hard work, and its disappearance occurring usually while she was taking potassic iodide. Her general health has always remained good. There has been no pain about the tumor or elsewhere, no dyspnœa, dysphagia, cough, or other pressure symptoms. Her appetite has never failed.

FIG. 1.

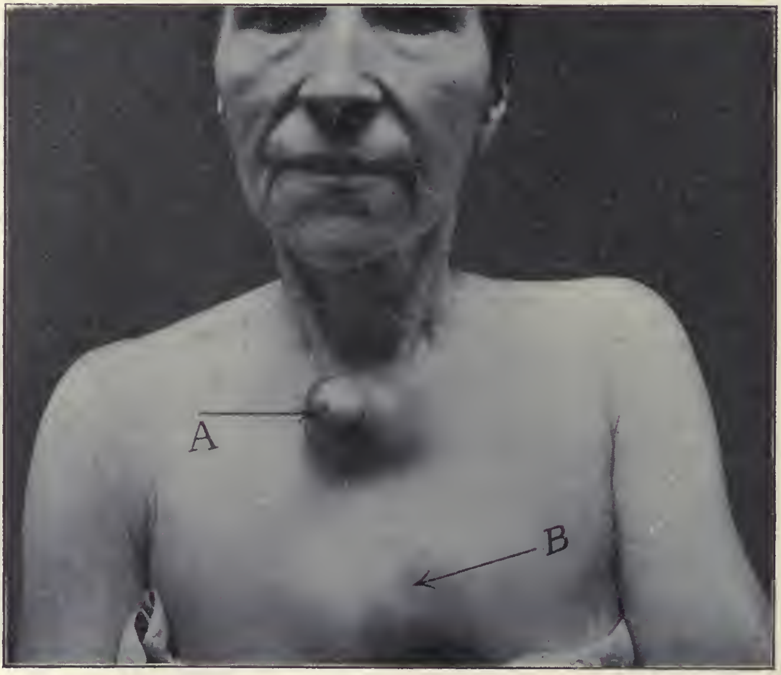


Tumor before rupture. B indicates the position of the lower swelling.

Physical Examination. A rather small, spare, sallow woman, bright and intelligent mentally. Over the manubrium in the middle line was a tumor the size of a lemon, shaped like the stump of a cow's horn, projecting about two inches above the sternum, the point directed somewhat to the right. The apex of the tumor was black and gangrenous-looking, with a deep red ring around it, shading to lighter red at the base, whence there radiated across the chest many highly-colored, dilated venules.

The tumor was soft and elastic in consistency, and pulsated with every heart beat, the pulsation being slightly expansile and causing the apex of the tumor to rock slightly from side to side. A soft, blowing, systolic murmur was audible everywhere over it.

FIG. 2.



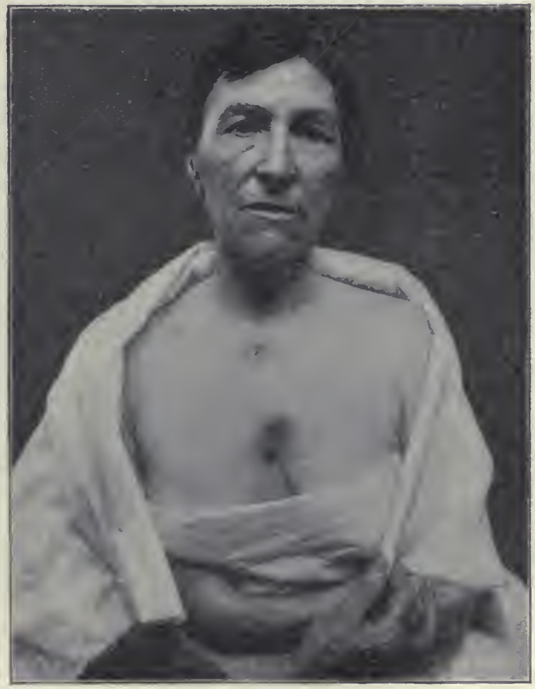
Tumor before rupture. B indicates the position of a second swelling lower down.

Below this tumor and at the level of the third and fourth costal cartilages was a second pulsating mass, larger, flatter, and less inflamed than the other. This mass was also in the median line and covered the sternum over an area as large as the palm of the hand. (See Figs. 1 and 2, B.) This second mass was not elevated more than one-half an inch above the surface, and was only slightly red; nowhere gangrenous. It rose and fell with each beat of the heart, but was not apparently expansile. Its consistency was about the same as that of the upper mass. No murmur was heard over it, but the heart sounds were transmitted.

The heart's apex was in the fifth interspace, nipple line. At the base, around as well as over the tumor first described, was a soft systolic murmur, heard best over the pulmonary valve, and but faintly at the apex. Second sounds normal.

Radial pulses equal and synchronous; no tracheal tug; pupils equal and react normally; no unilateral flush or sweating. Voice natural. Lungs and abdominal organs negative; no glandular enlargement; reflexes normal. Scattered over the back and to a less extent on the chest and arms are many small white scars, due, the patient says, to chicken-pox. Larger scars on the front of both thighs following "boils."

FIG. 3.



Appearance after rupture of the tumor.

Temperature 98°, pulse 80, respiration 27.

Patient entered the hospital in the service of Dr. E. G. Cutler, who made the diagnosis of gummata of the sternum, and gave potassic iodide, gr. 90 per day. On the third day the upper tumor broke and a small quantity of bloody puriform material escaped, reducing the size of the mass at least one-third. The patient was transferred to the service of Dr. J. W. Elliot, and eleven days after the day when I first saw her the lower swelling was opened without ether, and material like that from the upper mass was evacuated. A week after this the patient went to the Waverly Convalescent Home, feeling very well, having gained twelve pounds during her stay at the hospital. She was evidently half-starved before entrance.

After a fortnight at Waverly she reported to me at the out-patient department, looking well and bright. The appearance of her chest at this time—a month from the time I first saw her—is shown in Fig. 3. There was *no prominence* at the site of either tumor. One inch below the sternal notch in the median line was the opening of a small sinus which the probe, manipulated by Dr. C. A. Porter, entered for a distance of nearly three inches, the direction being mostly downward parallel to the anterior surface of the sternum. The point of the probe when in this position could not be felt from the outside, and this, together with the fact that the probe passed first backward toward the spine and then downward parallel to the sternum, convinced Dr. Porter that his probe had passed entirely through an opening in the bone and was in a sinus behind it. At the bottom of the lower opening near the ensiform rough bone could be felt with the probe. Dr. W. W. Gannett saw her at my request soon after this, and agreed with Dr. Cutler that there was no aneurism present. (An X-ray picture was taken at my request. Of this I shall speak later.)

I saw the patient several times in August, and found her always doing well and at work, though a small sinus persisted over the point where the upper tumor had been, and the fluid in this sinus could be seen to rise and fall with every heart beat. She dressed this sinus at home with sterile dressings, for which she came to the hospital now and then.

On Saturday, September 9th, she reported at the out-patient department, and, as I was then in Puerto Rico, she saw Dr. A. K. Stone, who found her to be doing well, and encouraged her as to her future, but she says that during September she noticed a sound described as like water falling drop by drop on a tin roof. The sound seemed to come from the region of the sinus in the sternum, and her husband states that it could sometimes be heard twelve feet away.

On the evening of September 15th she seemed very well and bright (her husband says) and went to bed feeling as usual. At midnight she got up and took up a pitcher of water, probably for a drink. There was the sound of a gush and a cry. The husband jumped up, lighted a match, and found her dead in a pool of blood issuing from her chest. There was no autopsy.

The remarkable points about this case are:

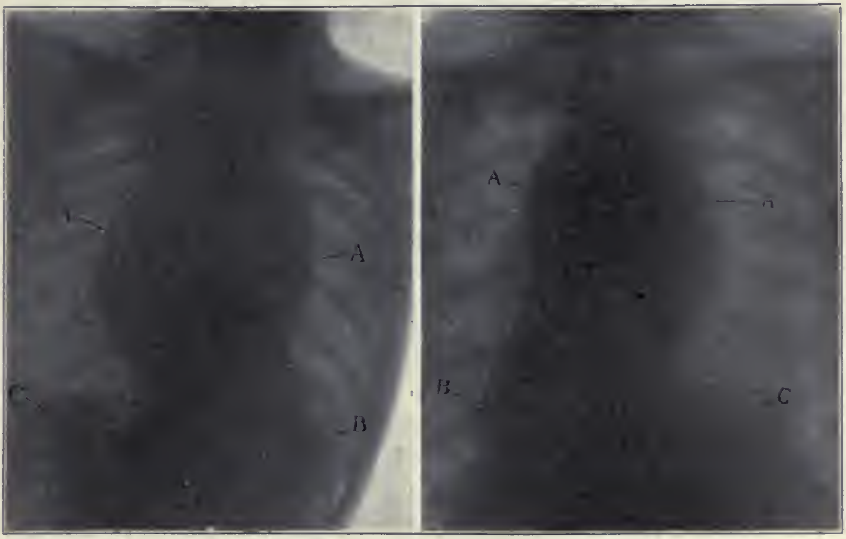
1. That the aneurism eroded and perforated the sternum in two places without ever causing pain or any other pressure symptoms.

2. That it presented externally as a tumor, and then disappeared under treatment by iodide of potassium, the skin rupturing without letting out any blood. This series of events was repeated several times in the course of seven years.

I do not see how the diagnosis of aneurism can be in doubt in view of the termination of the case. Whether the process going on in the sternum may have been partly gummatous and partly due to the pressure of the aneurism, and exactly what was the cheesy material which was discharged during her stay in the hospital, I do not know. The probe showed that the hole through the sternum was a comparatively small one, not nearly as large as the base of the tumor which presented over it. I suppose that at times the clot inside the sac was sufficiently firm to prevent the blood from forcing its way out through the perforated sternum, while at other times the blood would ooze through it and clot outside the sternum, so as to form the external tumor which was present when I first saw her.

The accompanying radiographs (Fig. 4) should have prevented the mistake in diagnosis. But I am ashamed to say that none of those who saw her took a sufficiently intelligent interest in them to see their significance until it was too late.

FIG. 4.



Radiographs.

We looked at them solely for evidence as to perforation of the sternum. Finding no gap in the sternum shadow, the false inference was drawn that no such perforation was present. But we should have known that the position of the spinal column is such that perforations of the sternum even of considerable size do not show on a radiographic plate.

It is perfectly easy now to see that there is a tumor in the region of the aortic arch (see Fig. 4, A), and to distinguish the heart (B) and the liver (C) below. But, somehow, this did not force itself upon us at that time. The moral obviously is that we should know more about the interpretation of radiographic plates.

AN EXPERIMENT IN THE TRANSMISSION OF SYPHILIS TO CALVES.[1]

By Mazyck P. Ravenel, M.D.,

BACTERIOLOGIST TO THE STATE LIVE-STOCK SANITARY BOARD OF PENNSYLVANIA; LECTURER ON BACTERIOLOGY, VETERINARY DEPARTMENT, UNIVERSITY OF PENNSYLVANIA.

(*From the Laboratory of the State Live-stock Sanitary Board.*)

That syphilis is a disease peculiar to man and incapable of transmission to the lower animals is generally accepted by the medical profession, and upon such firm ground does this opinion appear to stand that most text-books make the statement without going into the details of the experiments on which it is based. Apart from the scientific interest which the subject bears, there is a practical importance attaching to it which must hold our attention, owing to the fact that the opponents of vaccination against smallpox lay great stress on the alleged danger of transmitting syphilis by vaccination, some of them even going so far as to claim that syphilis and vaccinia are one and the same disease. The agitation against vaccination in our own city and State during the year just closed, and the assertions made by certain doctors before a legislative committee of the dangers involved in the practice, must be fresh in the minds of all. It was this agitation that suggested to Dr. Leonard Pearson and myself the advisability of repeating once more the attempt to produce syphilis in calves by inoculation from man.

In looking over the record of experiments on this subject I have been unable to find any report of the successful inoculation of bovines, failure having resulted in every instance of which I have knowledge, though there are experimenters who have claimed success in inoculating rabbits, guinea-pigs, cats, dogs, horses, pigs, and monkeys—a fact which is somewhat significant.

The scope of this paper does not permit me to go into a critical review of past experiments, nor, indeed, do I think it necessary. I have been impressed, however, by the fact that several of those who have claimed success have employed material from soft chancres, while others have used tuberculous matter, as suggested by Striker, who examined the supposed syphilitic nodules induced by Hansell, and also by Kaposi in regard to the same work.

The admirable work of Dr. Ernesto Duplan, done in the pathological laboratory of the University of Pennsylvania, and detailed in his graduation thesis (1884), deserves mention. He made seventy inoculations, using fifteen rabbits, five dogs, four guinea-pigs, and four apes, which he imported from Mexico himself for the purpose. His results were all negative, with the exception of two rabbits inoculated with pus from a soft chancre. In these an indurated lump formed at the point of inoculation, which opened spontaneously on the twelfth and thirteenth days respectively, discharging thick, cheesy pus. With this pus four rabbits were inoculated, one of which died of tuberculosis at the end of four weeks, the others showing no ill effect. Although he cites these two cases as examples of successful transmission of syphilis to rabbits, I think it is clear that he was dealing with tuberculosis.

---

[1] Read before the Pathological Society of Philadelphia, February 8, 1900.

Among the lower animals there is only one disease known that bears any resemblance to syphilis—dourine or maladie du coit—sometimes called also syphilis of solipedes. This remarkable and interesting disease has been known for more than a hundred years, and is supposed by some to have had its origin in the coitus of syphilitic Arabs with she-asses. There is, however, absolutely no evidence of this, it being wholly theory, while on the contrary all attempts to produce dourine in mares and she-asses by infection with syphilitic virus have failed completely. Furthermore, the specifics against syphilis—mercury and iodide of potash—have no effect in dourine. The disease has been seen only twice in the United States, both times in imported stallions. It has been carefully studied in Europe, notably by the able veterinarians of the Alfort school, so that it is possible to affirm with certainty that dourine and syphilis are two entirely distinct diseases.

For our experiment two calves were selected, one a heifer, about eight months old, the other a bull, about fourteen months old, both in good condition, though the heifer was known to be tuberculous. Both had been on our premises and under observation for some months. The method of inoculation chosen was that practised by some of our best vaccine producers. The area selected was shaved, washed thoroughly with soap and water, and well rinsed with sterile water, after which a surface about the size of a silver half-dollar was scraped with a sharp scalpel until a slightly bloody serum began to exude. It was next scarified with the ordinary scarifier used in vaccination, in two directions at right angles to each other, and into this the syphilitic material was rubbed for not less than five minutes. A second scarification was then done, and the animals kept down until the surface had dried. The heifer (Ref. No. 26107) was inoculated in two places, on the inner side of the hind leg high up and on the abdomen just anterior to the udder, while the bull (Ref. No. 26130) was inoculated only on the inner side of the hind leg.

The material used was obtained through the kindness of a physician from a patient in the venereal ward of a hospital with which he is connected, and consisted of scrapings from a mucous patch on the lip and a sore about the genitals. The case was in the early secondary stage and the material taken at the commencement of treatment. It was collected at 11.30 A.M., and the inoculations made at 2 P.M. the same day.

On the next day the scarified areas were covered with a thin scab, and were surrounded by a narrow zone of slight redness, which disappeared during the next thirty-six hours. By the fifth day the scabs had loosened at the edges and dropped off on the ninth day. At no time was there any appreciable amount of inflammation or swelling, nor did the animals show any discomfort. The temperatures were taken soon after the inoculation, and twice daily for fifteen days, as given below:

RECORD OF TEMPERATURE.

Calf No. 26107.			Calf No. 26130.		
Date.	A. M.	P. M.	Date.	A. M.	P. M.
August 12 . .	. . . .	102.6	August 12 . .	. . . .	103.6
“ 13 . .	102.2	104.2	“ 13 . .	102.6	104 2
“ 14 . .	102	102.3	“ 14 . .	102 8	102.2
“ 15 . .	102.4	102 6	“ 15 . .	101.6	101
“ 16 . .	102	102	“ 16 . .	102 4	102
“ 17 . .	101	102	“ 17 . .	101.2	102.4
“ 18 . .	101.2	101.2	“ 18 . .	102	101.4
“ 19 . .	101.3	102	“ 19 . .	101.2	101 2
“ 20 . .	101	102	“ 20 . .	102.2	102.2
“ 21 . .	101.2	102	“ 21 . .	102	102
“ 22 . .	102	102	“ 22 . .	102	102.2
“ 23 . .	102	102	“ 23 . .	101.8	102
“ 24 . .	101.4	101.8	“ 24 . .	102	102
“ 25 . .	101.6	102	“ 25 . .	101.4	101.8
“ 26 . .	102	101.8	“ 26 . .	101.6	101.4
“ 27 . .	102	102	“ 27 . .	101.6	102

Calf No. 26107 was kept under observation until October 5th, fifty-four days after inoculation, when it was killed. It was impossible to detect the points of inoculation, nor could any lesions be found in any part of the body which were in the least suggestive of syphilis. The animal was known to have tuberculosis, which the examination showed to be very limited, confined to a few nodules in the lung. A portion of the sciatic nerve, taken from the region of inoculation, and a section of the dorsal spinal cord were sent to the Pepper Clinical Laboratory, where they were examined by Dr. McCarthy, whose report is as follows:

“The examination of the central nervous system and the peripheral nerves of the calf No. 26107, inoculated with syphilis and sent to me by you, revealed no changes either by the Marchi osmic acid method, the Nissl cell stain, or the Weigert sheath stain. The peripheral nerves teased and stained by osmic acid were likewise normal.

“D. J. McCARTHY.”

Calf No. 26130 was kept under observation until December 28th, one hundred and thirty-eight days, when it was killed. A few days before it had been tested with tuberculin and found to react. In this animal, as in the other, it was impossible to detect the point of inoculation, nor could any change in the skin be detected after removal. The organs were entirely normal with the exception of one lung, which contained a cheesy tubercular nodule three-fourths of an inch in diameter. Dr. McCarthy's report on the nerves and spinal cord is as follows:

“An examination of the central nervous system and peripheral nerves of calf No. 26130, inoculated with syphilis, gave negative results with the fresh osmic acid method, Marchi method, Weigert and Nissl stains. The specimens were perfectly normal. D. J. McCarthy."

The result of these two experiments, which were conducted with the greatest care, has been entirely confirmatory of the work of those observers who, like Neumann, have failed in all attempts to transmit syphilis to the lower animals, and who hold it to be impossible.

I apprehend that some may object to the value of these experiments, on the ground that the animals were both tuberculous, a fact which did not escape my attention. In man the two diseases are not rarely met with coexisting in the same individual, and the presence of tuberculosis appears to make the patient more susceptible to syphilis. Says Landouzy: "In this association syphilis finds the subject without resistance, and, furthermore, affording no hold to specific medication. . . . The worst morbid association that I know is the union of a pulmonary tuberculosis with a commencing syphilis (*Congrès pour l'étude de la Tuberculose*, 1891, p. 185)."

In closing I wish to make acknowledgment of the efficient services of my assistant, Mr. S. H. Gilliland, in the carrying out of this experiment, and of my indebtedness to Dr. D. J. McCarthy for his examination of the nerves and spinal cord.

GUMMA OF THE IRIS AND CILIARY BODY. RECOVERY WITH NORMAL VISION.[1]

By Charles A. Oliver, A.M., M.D.,
ATTENDING SURGEON TO WILLS EYE HOSPITAL; OPHTHALMIC SURGEON TO THE PHILADELPHIA HOSPITAL, PHILADELPHIA.

On November 20, 1895, a private patient, C. C. E., a thirty-seven year-old book-keeper (a self-proclaimed syphilitic), applied to me with the history that six years previously the left eye had become primarily inflamed, the sight of the eye being permanently lost in a few weeks' time. At that time he had placed himself under the care of several physicians, who had given him both local and general treatment—one doing an iridectomy.

He came complaining that the vision of the right eye, which was good until two weeks before I saw him, had become very much impaired, and that the eye was painful and somewhat inflamed.

Examination showed that the cornea of the left eye was distorted, and the iris-crypts were thickened. There was a dense, false cataract with calcareous areas on the anterior capsule of the lens. Numerous old, quite firm and unbreakable synechiæ surrounding a small, irregular pupil, in which there was imperfect superiorly situated coloboma, were plainly visible. The globe was soft and there was some ciliary and tarsal congestion. Vision was reduced to mere perception of light in a small concentric field of about twenty degrees around the fixation-point.

---

[1] Read before the November, 1899, meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia.

The right eye gave evidences of a commencing irido-cyclitis. The anterior chamber was deepened, and the iris-plane was markedly indrawn. Intraocular tension was subnormal. The crystalline lens was slightly swollen and somewhat hazy. Vision, which was one-tenth of normal, could be brought to one-half acuity by the aid of a minus spherical lens of three diopters' strength. Atropine and hot stupes locally, bidaily, with inunctions of mercury, were ordered.

In three days' time intraocular tension in the right eye had become normal. The pupil was fairly well dilated, and there were but two or three fine synechiæ situated at its temporal border. The crystalline lens remained hazed and the iris was still indrawn. Corrected vision with the aid of the following lens combination (—S. 3, D. ○ —C. 0.75 D. ax. 90°) had fallen to one-fifth of normal. The fields of vision for white, red, and green were concentrically diminished to about one-half of their ordinary size; no scotomata could be determined.

The case being urgent and one that demanded constant treatment, while the financial condition of the patient was such that he was unable to have this done, I had him admitted into the wards of Wills Eye Hospital, the treatment as previously laid down being continued.

In two days' time a well-marked swelling in the upper outer ciliary region appeared, the mass evidently being situated beneath the scleral coat. With it there was associated a similar though much smaller swelling in the iris tissue at a corresponding point in the region of the major circle. Vision continued about the same.

In spite of a pronounced ptyalism, Dr. William F. Norris (to whom I showed the case in consultation) and I agreed upon increasing the mercurial inunctions to three drachms daily, using a mouth wash of listerine. The local treatment of atropine (to which was added scopolamine) and constant hot stupes was continued.

Two days later the scleral swelling was found to be slightly lessened, while the gummous mass in the iris had broken and discharged its contents into the aqueous humor, giving an appearance as seen in so-called gelatinous iritis. The pupil was dilated to five by six millimetres, its long axis being at seventy-five degrees. There remained but one small synechia in its upper outer part. The crystalline lens haze had lessened to a sufficient degree to make it evident that the vitreous humor was permeated with a thickened and a slightly translucent material, through which the fundus of the eyeball could be distinctly seen. Vision was reduced to one-sixtieth of normal, while small areas of red and green placed in the still reduced visual field could be distinguished only with the greatest difficulty. Treatment was continued.

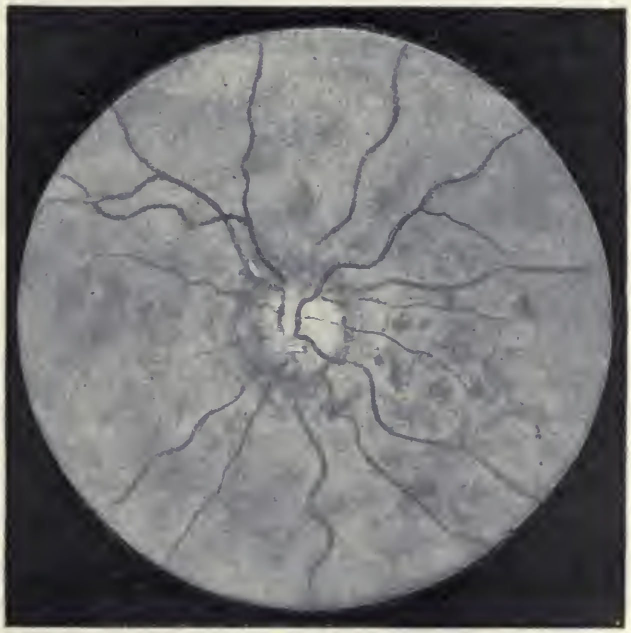
Gradually during the next two weeks' time vision increased to five-thirtieths of normal, the fundus details being still faintly visible through a great number of coarse fresh vitreous opacities. The gummous discharge into the anterior chamber had disappeared.

The patient remained in the hospital practically under the same treatment for three weeks longer. His vision at this time equalled one-sixth of normal, this being obtained by the correction of a compound hypermetropic astigmatism of about two diopters' strength. He was then discharged as an out patient.

One month later the eye-grounds could be plainly seen. The iris was mobile, and, with the exception of a quite pronounced descemetitis and a few remaining vitreous opacities, the media were clear. No trace of the ciliary swelling could be seen, while that portion of the tissue of the iris which had been previously infiltrated and the most affected had become degenerate and steel-gray in color in contrast with the rest of the membrane, which was fairly healthy in condition and light-blue in tint.

Except for two slight attacks of similar conditions, in which vision was reduced to one-fortieth of normal, during the months of March and June of 1896, lasting but a few days each, there was not any return of the gross symptoms up to the middle of the year 1897, when the patient was seen for the last time.

During the summer of 1896, immediately after the second exacerbation, a few small transparent blebs that were superficially seated appeared in the right cornea immediately opposite the pupillary area. These, however, subsided in a few days' time, and never recurred while the case was under observation. When the patient was last seen the vitreous opacities were almost entirely cleared away and corrected vision was nearly normal.



Ophthalmoscopic appearances of neuroretinitis from uveitis.

The fields of vision of the saved eye were never greatly disturbed, suffering slight concentric contractions only during the inflammatory exacerbations.

The eye-ground never presented any gross pigment changes and depositions as are so frequently seen in many cases of low-grade choroidal inflammations. The most unusual condition of the fundus (neuroretinitis from uveitis), as found between two of the exacerbations, can be seen in the accompanying sketch, which was made for me on May 18, 1896, by Miss Margaretta Washington, of this city.

Remarks. For several reasons the case is interesting: The remarkable condition found in the fellow-eye, which most probably had suffered from a similar type of affection; the recovery of the organ with normal vision after three severe exacerbations; the endurance and positive value of large doses of mercury; the comfort obtained by the local use of heat, mydriatics, and cyclopegics; the discharge of the gummous material into the ocular media, with the rapid disappearance of the mass; the temporary change of refraction from farsightedness and astigmatism to nearsightedness and astigmatism; and the appearance and retention of the most curious ophthalmoscopic picture of chorioretinal disturbance.

THE VALUE OF ELECTROLYTIC DILATATION OF THE EUSTACHIAN TUBES IN CHRONIC TUBAL CATARRH AND CHRONIC CATARRHAL OTITIS MEDIA.[1]

By Arthur B. Duel, M.D.,
AURAL ASSISTANT SURGEON TO THE NEW YORK EYE AND EAR INFIRMARY; ASSISTANT SURGEON (NOSE AND THROAT DEPARTMENT) TO THE MANHATTAN EYE AND EAR HOSPITAL; CONSULTING AURAL SURGEON TO THE WILLARD-PARKER AND RIVERSIDE HOSPITALS.

A study of the literature of the past decade shows a remarkable change in the attitude of otologists toward chronic catarrhal otitis media. This change has been due not so much to any added knowledge regarding the pathology of the condition as to the method of treating it.

Not many years have elapsed since the patient suffering from this form of deafness was dismissed, often after the first examination, certainly after a short course of ineffectual treatment, with the cheerless assurance that the disease was irremediable; that he might go on for a considerable period without any serious advance of the trouble, but that it would probably grow steadily worse.

This was the prognosis given by the conscientious surgeon, who felt that he had no moral right to continue with the treatment then in vogue after failing to give any relief within a given time. The despairing patient, casting about for some ray of hope, sought in turn the advice of one specialist after another, usually meeting with the same dismal prognosis, until finally he was gathered in by some charlatan, who promised much, but accomplished little or nothing in the way of improvement other than the mental relief afforded by the thought that something was being done.

In more recent years, however, the keener appreciation on the part of otologists of the importance of nasal and nasopharyngeal obstruction and inflammation in the production of deafness, the improved methods of removal of these exciting causes, and, lastly, the well-grounded conviction that it is worth while, by persistent, painstaking effort, to arrest the advance of this condition, even if no brilliant improvement takes place, have accomplished much for the relief of sufferers with chronic tubal catarrh and chronic catarrhal otitis media.

---

[1] Read before the American Laryngological, Rhinological, and Otological Society, Cincinnati, June 4, 1899, and in part before the Harvard Medical Society of New York, January 6, 1900.

The dividing line between these affections is difficult to define, and, indeed, the determining cause usually being the same, the distinction is largely one of convenience. While it is possible that a chronic aural catarrh may begin in the tympanum, with no very marked evidence of any nasopharyngeal or tubal catarrh, it is usually the case that the tubal catarrh precedes or accompanies the tympanic inflammation. It is probably true in the majority of cases that the more serious inflammatory hyperplasia of connective tissue takes place first in the narrow Eustachian tubes, and that the hyperæmia of the tympanum is at first often mechanical or functional, due to the stagnation and consequent lowering of air pressure from lack of sufficient ventilation.

This functional hyperæmia, characterized by its deficiency in round cells, and the rapidity with which it is reabsorbed when the exciting cause (viz., the closure of the Eustachian tube or pressure on the plexus of veins which drains the tympanum) is removed, gradually changes to one of an inflammatory type in which there is an abundant pouring out of round cells which, by rapid proliferation and increase in size, form into an organized exudate. This inflammatory exudate and newly-formed connective tissue resulting from it, in contradistinction to the mechanical or functional exudate in a simple congestive hyperæmia, does not rapidly disappear when the exciting cause is removed (although its advance may thus be stopped), but has a tendency to further organize into connective tissue bands and cords which eventually, by a process of atrophy, bring about the sclerotic stage of chronic aural catarrh.

The writer does not by any means wish to be understood that he believes this to be the stereotyped process in every case of chronic catarrhal otitis media, realizing that in many cases the sclerotic process begins apparently from the start; but the number in which the tube is obstructed early in the course of the disease, and as a result is a chief contributing cause to the mischief done to tympanic structures, is sufficiently large to warrant the presentation of such a picture as a working hypothesis.

This view is largely supported by clinical experience where one finds in such a large majority of cases a marked temporary improvement in hearing following inflation, showing that the retracted membrana tympani and tympanic hyperæmia were largely functional, due to stagnation from Eustachian obstruction rather than to serious organic changes.

There is nothing new or novel in this view of the situation, and it is presented here as concisely as possible, merely as leading up to the proposition that the most important point in the treatment of the conditions under consideration is the ventilation of the tympanum by the early establishment and constant maintenance of the patency of the Eustachian tube, thus eliminating one of the most potent causes of the organic changes to tympanic structures which interfere with their function. This has long been well understood, and, as was remarked at the outset, improved methods and more persistent painstaking efforts on the part of otologists have done much to change the results of treatment.

In the earlier stages of tubal obstruction, when the tissues are swollen and succulent from circulatory hyperæmia, the reduction of the swelling by the air douche is now largely accomplished by the use of the Eustachian catheter, accompanied by the diagnostic tube, for the purpose of determining exactly what is being done, rather than by the use of the more inaccurate Politzer bag and dependence on the statement of the patient as to whether or not the tympanum has been inflated.

Later on, when the inflammatory exudate has been poured out, much has been accomplished to hasten its reabsorption by inflation with stimulating vapors.

In the later stages, however, where the exudate has begun to organize into fibrous tissue, it has been found necessary to use bougies to overcome the obstruction. For this purpose bougies of whalebone, metal, and cotton have been constructed and used with marked success.

Lastly, these dilatations have been made by electrolysis, the metal bougie being made the negative pole of the galvanic current. It is for the purpose of calling attention again to the great usefulness of this procedure in the relief of Eustachian obstruction that this paper has been written.

Electrolysis for the purpose of dilating strictures was first made use of by Crussel in 1839, and was first employed systematically in 1867 by Mallez and Tripier, of Paris. In this country, Dr. Robert Newman, of New York, has made use of it, mainly in the treatment of urethral stricture, for more than twenty years, and, in the face of most bitter opposition, has demonstrated its great value.

It was due to a study of its use in this connection and an observation of its practical utility that the author was led to employ it in the dilatation of stricture of the Eustachian tube. After speaking with a number of prominent otologists, none of whom had known of its previous use in this way, the method was reported as new. A more careful investigation of the literature, however, shows that it was used in London by Mr. Cumberbatch and Dr. W. E. Steavenson in 1888. Seven cases are reported in the *Lancet* for November of that year. The cases all showed improvement, although at that time they had not been long under observation. In an article published in the *New York Medical Record* for December, 1898, Dr. Robert Newman mentions having used the electric current some years ago, for the purpose of dilating strictures of the Eustachian tube, with good results.

Neither Steavenson nor Newman used a bougie which could be protruded for more than an inch from the tip of the catheter, and this, in the writer's mind, would be a cause of failure in securing a patent tube in a large number of cases, since the organized stricture is often found more than that distance from the pharyngeal opening.

The method devised by the writer, without any previous knowledge of the work done by the above-named gentlemen, has been published in detail in previous articles, and is now being practised with marked success by many prominent otologists.

A bougie which could be protruded from the tip of the catheter an inch and a half, or more if necessary, has been passed directly into the tympanum in every instance where it has been possible.

The bougies are made of gold, and correspond in size to Nos. 2, 3, and 4 of the French scale. The smaller sizes are usually used. It probably does not matter so much about the size as that the current should be kept in contact with the hyperplastic tissue long enough for the electrolytic action to take place. The bougie is drawn through a small pure silver catheter until the oval head fits snugly in the opening at the tip. The other end is connected one and one-half inch from the opening by a delicate handle with the negative pole of the battery.

The catheter, after being carefully bent so that it will fit accurately in the mouth of the Eustachian tube, is insulated by winding a narrow strip of rubber tissue spirally from tip to ring. This being renewed each time it is used, the catheter and bougie being boiled, cleanliness is insured.

In any case where the tube is to be bougied the nose and nasopharynx should be carefully cleansed with an alkaline antiseptic solution, such as Dobell's or Seiler's, and afterward thoroughly anæsthetized with a 10 per cent. solution of cocaine. The patient is connected with the positive pole of the battery by an ordinary contact electrode held in the hand. The negative pole is attached to the bougie as just described. The tube is bougied in the usual manner, the bougie being pushed along until it meets with a definite obstruction. Instead of forcing through this by heavy pressure the current is turned on up to from 1 to 3 m. amp., according to the sensation of the patient, and after twenty seconds to a minute the bougie usually will be felt to pass on through the softened stricture with a gentle pressure. At the same time the patient will usually hear "bubbles breaking in the ear." If the desired result is not obtained at the end of a minute or two, no greater pressure should be used, but more current-strength turned on.

It has been the writer's custom not to use more than five milliampères current-strength, nor a contact longer than five minutes at one sitting. This should be repeated at intervals of one week to one month, being guided as to its frequency by the result indicated by inflation every other day. Usually two to four sittings will be sufficient.

The battery should have from thirty to fifty volts, and should be supplied with a good rheostat and milammeter.

It is with the hope that otologists who have not already done so may be convinced of its superiority and led to employ this method of dilating strictures of the Eustachan tube, that the writer calls their attention to the results of the past three years' work in Eustachian electrolysis.

Something over a year ago, through the friendly efforts of Dr. J. F. McKernon, a room at the New York Eye and Ear Infirmary was equipped for the purpose of systematically carrying on this work, and it is by his suggestion and through his courtesy that the writer has devoted the greater portion of his time in the infirmary for the past year in an attempt to fix the value of electrolytic dilatation of strictures of the Eustachian tube. During this time some fifty cases selected from Dr. McKernon's clinic have been bougied, a careful record of the results being kept. As many as these as have persisted for a sufficient length of time to make their record of any value, together with ten cases from Dr. Denich's clinic, reported about two and one-half years ago, and a number from the writer's private records (in all fifty cases), have here been tabulated for the convenience of those who wish to study them more carefully at their leisure.

To read them now would be tiresome, and I shall only recount briefly the history of the three typical cases and present for your consideration the conclusions arrived at from the experience gained in the treatment of the whole number.

Case I.—Dr. S., aged twenty-eight years, for six or eight months suffered from repeated attacks of tubal catarrh accompanied by deafness, pulsating tinnitus aurium, and a sense of pressure in the left ear. These attacks were relieved by attention to a chronic nasopharyngeal catarrh and inflations through the Eustachian catheter, first with air and later with vapor of iodine and menthol. In spite of constant efforts in this manner the intervals of relief grew shorter, until finally the tinnitus, deafness, and sense of pressure were constant, although at times much more prominent than at others. During this time there was evidence of a constantly narrowing calibre of the Eustachian tube. A No. 3 (French scale) bougie, attached to the negative pole of the galvanic current, was passed into the tube three-quarters of an inch, when it met with an obstruction. Two milliampères current-strength was turned on, and this gradually increased to 4 m. amp. With a slight pressure the bougie passed through a stricture one-quarter inch long, and then on into the tympanum without meeting any further obstruction. Inflations were kept up every day for the next week. There was a gradual increase in the amount of air which entered the tympanum on inflation. After the second day the tinnitus stopped entirely for about a week, when there was slight recurrence for two or three days, coming on intermittently. The tube was bougied again in the same manner. Inflations at intervals of two days for two weeks following showed the tube to be freely opened. There was complete relief from the sense of pressure, no tinnitus whatever, and the hearing was perfect. Several weeks afterward, at the time of this writing, there has been no recurrence. Nothing other than careful attention to the nasopharyngeal catarrh has been done for more than a month.

Case II.—R. D., aged nineteen years, history of deafness and marked tinnitus in right ear, and slight vertigo for several years. Functional test shows lower tone-limit 512 v. s.; whisper, six feet; acoumeter, three feet; bone conduction increased. Practically complete stenosis of right Eustachian tube. Attempted inflation fails to improve. For three months—from October, 1896, to January, 1897—the tube was bougied by this method eight times, at intervals varying from one week to one month, inflations being made in the intervals. During this time, practically from the day of the first bougie, there was no tinnitus or vertigo. The hearing distance came up from six feet for the whisper to twenty-five feet, and for the acoumeter from three feet to twenty-four feet. The patient said he heard ordinary conversation perfectly, and easily heard the tick of a clock fourteen feet away which he had formerly heard only on contact. The tube was freely opened on inflation. During the following nine months, instead of presenting himself for occasional inflation, he remained away. He then returned, saying that the hearing was getting worse again. This was found to be true, but on inflation the tube was found to be quite patent and the hearing distance gradually came up after a few inflations nearly to the former point. He was then lost sight of until October, 1898, two years from the time of the first bougie, when he again appeared, stating that he was getting worse. Inflation showed that the tube was still open, and was followed by an immediate improvement in hearing again.

Case III.—Mrs. V., a singer of considerable prominence, had been growing gradually deafer for fifteen years up to May, 1898, despite the fact that she had been under treatment by many distinguished otologists. At that time she presented herself for treatment, stating that she was losing confidence in her ability to place tones properly, owing to the sensation that she was "singing in a barrel." There had been vertigo and tinnitus at intervals. The functional examination was as follows: Lower tone-limit: right, 512; left, 256; b. c. increased on both sides. Whisper: right, four inches; left, two feet. Acoumeter: right, one-half inch; left, one-half inch. Both tubes were constricted and both membrana tympani retracted.

Inflation improved the left but not the right. Both tubes were bougied twice at intervals of two or three weeks. Marked improvement followed. The tubes admitted air much better on inflation, and the hearing distance increased to two feet on the right side and six feet on the left side for whispers. The sensation of fulness in the head and inability properly to place tones in singing largely disappeared, and the hearing for conversation and all sounds improved. Inflations have been kept up for the past year about twice a week, with a rest of about four months during the patient's absence from town in hot weather, and about one month in winter. The tubes still remain open, and the tests show the same improvements first noted for the whisper and acoumeter. The lower tone limit has improved one octave on either side. The tinnitus and vertigo for the past year have been present much less frequently, appearing only on a few occasions, when the patient has suffered from cold in the head.

TABULATED REPORT OF FIFTY CASES.

Forks used in tests were Hartmann's series and Dench's, ranging from 26 to 64 v. s. (double).

No. of case.	Age	Sex	Duration of deafness.	Tinnitus.	Vertigo	Lower tone-limit, first test.	Bone conduction.	Whisper, first test.	Acoumeter, first test.	Situation of stricture in inches from pharyngeal opening of tube.	No. times bougied.	Period of time under observation.	Whisper, last test.	Acoumeter, last test.	Tinnitus, last note.	Vertigo, last note.	Condition of tubes at last test.
1	45	F.	2 mos.	2 mos.	Occasional.	R 512 L 30	+ +	30 feet 30 feet	1½ feet 1½ feet	½ inch ½ inch	4 3	8 mos.	30 feet+ 30 feet+	6 feet 4 feet	…………	…………	Freely open, fairly well open.
2	23	F.	7 mos.	7 mos. 7 mos.	No	R 64 L 128	N N	30 feet 30 feet	15 feet 6 feet	½ inch	1	2 wks.	…………	30 feet	…………	…………	Open.
3	57	F.	1 year	1 year	Occasional.	L……	……	L 8 feet	…………	¾ inch	1	………	…………	……… ..	…………	…………	Did not return.
4	25	F.	3 mos.	1 year	No	R 30	+	30 feet+	30 feet+	¾ inch	1	3½ mos.	30 feet+	30 feet +	Gone	…………	Open.
5	25	M.	5 years	5 years	"	R 64 L 64	— —	+	…………	½ inch	4	5 mos.	Greatly improved.	…………	Much diminished.	…………	"
6	47	F.	3½ mos.	……	Occasional.	R 64 L 64	…… ……	3½ feet 6 feet	½ inch 1 inch	¼ inch 1 inch	4 3	11 mos.	Slightly improved.	…………	Much diminished.	…………	" "
7	40	F.	7 years	……	No	R 256 L 256	N N	1½ feet not at all.	1½ feet not at all	¼ & 1 in.	4	8½ mos.	Improved.	Improved.	Very much diminish'd.	…………	"
8	57	M	10 years	……	"	R 512 L 512	N N	30 feet 30 feet	4 feet 4 feet	½ inch 1¼ inch	2 1	6 mos.	30 feet+ 30 feet+	18 feet 16 feet	Entirely gone.	…………	" "
9	21	M.	3 mos.	Yes	"	R 26 L 26	+ +	30 feet 30 feet	3 feet 3 feet	1¼ inch	5	10 mos.	30 feet+ 30 feet+	………… …………	Very much diminish'd.	Very much diminish'd.	"
10	16	F.	6 mos.	"	"	Gal. 45	……	R 1 foot L 30 feet	1 foot 30 feet	½ inch	1	1 mo.	20 feet+	20 feet	Entirely gone.	Entirely gone.	"
11	48	F.	21 mos	"	……	……	……	R 26 feet	W 14 in.	¼ & ½ in.	2	1 mo.	…………	W 24 in.	Stopped	…………	Fairly well open.
12	32	F.	4 mos.	"	No	.. ...	……	R 8 feet L 24 feet	2 feet	¾ inch	2	1 mo.	30 feet+	11 feet	Stopped	…………	Open.
13	37	M.	6 mos.	"	"	R 40 L 128	……	32 feet 4 feet	2½ feet ½ inch	½ & 1¼ in. 1½ inch	3 4	4 mos.	30 feet+ 30 feet+	6 feet 3 feet	Improved.	Improved.	Partly open.
14	23	F.	4 years	"	"	……	……	…………	…………	1 inch	3	6 mos.	…………	…………	Not improved.	Not improved.	Open.
15	40	F.	20 years	1 year	"	R 256 L 32	……	4 inches 30 feet	½ inch	¼ inch	2	4 mos.	24 inches	4 inches	Much improved.	Much improved.	"
16	53	M.	15 years	15 years	10 years	……	……	4 feet 10 feet	4 inches 2 feet	¼ inch ¾ inch	1	1 mo.	6 feet 12 feet	…………	Did not return for treatment.		

17	19	F.	2 mos.	Yes	No	......	......	....	....	L 1 inch	2	3 mos.	....	....	Stopped	Stopped	Open.
18	22	M.	7 mos.	"	Yes	R 26 L 26	N N	30 feet + 30 feet	30 feet + 30 feet +	1 inch	1	....	....	....	Entirely relieved.	Entirely relieved.	"
19	26	M.	5 mos.	"	No	R 256 L 26	+ N	8 feet 30 feet	3 inches 30 feet	½ inch	2	5 mos.	30 feet 30 feet	30 feet 30 feet	Entirely relieved.	Entirely relieved.	"
20	22	F.	2 years	"	"	R 128 L 512	+ +	4 in. cannot distinguish contact.	½ inch	½ inch 1 & 1½ in.	1 2	4 mos.	Much improved.	Much improved.	Relieved.	Relieved.	Partly opened.
21	34	F.	7 years	"	"	R 256 L 256	+ +	9 feet 15 feet	6 inch 10 inch	1 inch 1 inch	3 1	4 mos.	Much improved.	Much improved.	Relieved.	Relieved.	Only partially opened, strictures not passed; patient left.
22	30	F.	1½ yrs.	"	"	R 128 L 512	+ +	10 feet 4 feet	10 feet 4 feet	1 inch ¾ inch	1 3	1 year	30 feet 12 feet	16 feet 8 feet	Much relieved.	Much relieved.	Fairly open
23	48	F.	1 year	"	......	......	......	....	....	L 1 inch	2	1 mo.	....	....	Stopped	Stopped	Open.
24	40	M.	4 years	"	No	512	—	2 feet	½ inch	½ & 1¼ in.	3	2 mos.	No improvement.	No improvement.	....	....	Fairly open
25	14	M.	2½ mos.	"	"	R 26 L 40	......	26 feet 26 feet	26 feet 26 feet	1 & 1¼ in. ¾ inch	3 2	2 mos.	....	....	Stopped	Stopped	Open.
26	37	F.	7 mos.	"	"	R 512 L 512	— —	8 inches 8 inches	½ inch ½ inch	1 inch 1 inch	2 2	3 mos.	No improvement.	No improvement.	No improvement.	No improvement.	"
27	47	M.	5 years	"	"	......	......	R 10 in. L 8 in.	4 inches 8 inches	½ & 1¼ in. ¾ inch	3 4	2 mos.	Improved.	Improved.	Stopped	Stopped	Fairly open
28	38	M.	30 years	14 years	Yes	512 512	— —	4 feet 1 foot	2 feet 1 foot	1¼ inch 1 inch	2 2	8 mos.	No improvement.	No improvement.	Greatly diminished.	Greatly diminished.	Fairly open
29	16	F.	3 years	Yes	No	512 512	+ +	10 feet 6 feet	5 feet 3 feet	¾ inch ½ & 1¼ in.	1 1	1 mo.	Much improved.	10 feet 6 feet	Greatly diminished.	Greatly diminished.	Open.
30	54	M.	20 years 1 year	"	"	35 gal. 128	+ —	Not at all	Contact	Complete stenosis +2 inches 1 inch.	5 3	5 mos.	Marked improvement of hearing.	Marked improvement of hearing.	Marked improvement of hearing.	Marked improvement of hearing.	Fairly open
31	43	M.	9 mos.	"	"	64 32	— N	1 feet 27 feet	1 inch 4 inches	½ & 1½ in.	2	1 mo.	Slight improvement.	Slight improvement.	Slight improvement.	Slight improvement.	Open.
32	20	F.	5 years	"	"	256 256	......	15 feet 15 feet	6 inches 6 inches	¼ inch 1 inch	3 2	10 mos.	20 feet 20 feet	10 feet 12 feet	Diminish'd	Diminish'd	"
33	37	M.	10 years	"	Yes	128 1024	— N	30 feet 4 feet	3 feet Contact	¾ inch ½ inch	1 1	1 mo.	30 feet + 24 feet	30 feet + 11 feet	Diminish'd	Stopped	"
34	27	M.	5 mos.	"	"	......	......	....	....	1 inch	2	2 mos.	Improved.	....	Stopped	Stopped	Fairly open
35	...	M.	6 years	"	"	40 128	N +	30 feet 20 feet	30 feet 2 feet	....	1	1 mo.	30 feet	8 feet	Diminish'd	....	Open.
36	54	F.	2 years	"	"	512 40	+	30 feet 3 feet	30 feet 1 inch	1 inch	1	1 mo.	10 feet	6 inches	Improved.	Improved.	"

No. of case.	Age	Sex	Duration of deafness.	Tinnitus.	Vertigo	Lower tone-limit, first test.	Bone conduction.	Whisper, first test.	Acoumeter, first test.	Situation of stricture in inches from pharyngeal opening of tube.	No. times bougied.	Period of time under observation.	Whisper, last test.	Acoumeter, last test.	Tinnitus, last note.	Vertigo, last note.	Condition of tubes at last test.
37	41	M.	10 years	Yes	No	128 512	+ —	2 feet 2 inches	2 inches ½ inch	½ inch	2	3 mos.	Improved.	18 inches	Not improved.	Not improved.	Open.
38	59	M.	10 years	"	Yes	......	......	L 6 feet	....	1 inch	1	....	15 feet	....	Much improved.	Much improved.	Still very narrow.
39	51	M.	4 mos.	"	No	128 64	......	4 feet 20 feet	½ inch 3 feet	1 inch	2	1 mo.	24 feet	6 feet	Stopped	Stopped	Open.
40	34	M.	12 years	"	"	......	......	....	....	1 inch 1 inch	3 3	1 mo.	....	....	Very much diminish'd.	Very much diminished	"
41	42	F.	15 years	"	Yes	512 256	+ +	4 inches 2 feet	½ inch ½ inch	½ inch ¾ inch	2 2	1 year	2 feet 6 feet	6 inches 1 foot	Improved.	Improved.	"
42	19	M.	5 years	"	"	512 128	+	6 feet	3 feet	½ inch	8	2½ yrs.	25 feet	24 feet	Much improved.	Much improved.	"
43	66	M.	15 years	"	No	256 26	N N	20 feet 20 feet	2½ feet 2½ feet	½ inch 1¼ inch	3 3	1 year	30 feet 30 feet	4 feet 5 feet	Much improved.	Much improved.	"
44	48	M.	1 year	"	"	256 256	N N	3 feet 3 feet	1 inch 1 inch	¾ inch ½ & 1¼ in.	2 3	3 mos.	Much improved.	Much improved.	Improved.	Improved.	"
45	50	M.	5 years	"	"	128 128	— —	....	....	1 inch 1 inch	1 1	1 mo.	No improvement.	No improvement.	No improvement.	No improvement.	"
46	39	M.	10 years	"	Yes	128 1024	......	30 feet 4 feet	3 feet Contact	½ inch 1 inch	1 1	1 mo.	....	11 feet 1 foot	Diminish'd	Stopped	"
47	45	M.	15 years	"	No	26 26	N N	20 feet	8 feet	1 inch	3	1 year	30 feet	24 feet	Stopped	Stopped	"
48	66	M.	15 years	"	"	256 26	N N	20 feet+ 20 feet+	2½ feet 4 feet	½ inch ¾ inch	3 3	1½ yr.	30 feet+ 30 feet+	6 feet 10 feet	Improved.	....	Fairly open
49	60	M.	5 years	"	Yes	......	N	....	....	....	1	....	....	....	Stopped	....	Open.
50	48	M.	1 year	"	No	256 256	N N	3 feet 3 feet	1 inch 1 inch	1 inch ½ inch	3 2	4 mos.	4 feet 4 feet	Improved.	Stopped	....	"

The following conclusions are presented for consideration: 1. The pathological process in inflammatory conditions of the Eustachian tube and the tympanum is the same—*i. e.*, hyperæmia, followed by the exudation of round cells, which organize into new connective tissue, and subsequently atrophy. 2. The names chronic tubal catarrh and chronic catarrhal otitis media, then, should suggest only a difference in position of the inflammation and not in its character. 3. Where the affection is confined to the tube the impairment of hearing is functional, and is restored as soon as the normal patency of the tube is effected. This is true, also, of tinnitus and vertigo. 4. Tubal obstruction is present early in a very large percentage of all cases of chronic hypertrophic catarrhal otitis media, and in such instances is one of the chief contributing causes to the further advancement of the disease within the tympanum. 5. It is our duty, then, wherever there is a stenosis of the Eustachian tube to remove the obstruction as rapidly as possible. 6. In every instance where the obstruction is due to an organized exudate the best method for its removal is electrolysis, for the following reasons: (*a*) It is more rapid. In several instances one application of the electrolytic bougie has been sufficient to cause the reabsorption of the deposit, and in the majority of cases only a few applications have been necessary to secure a patent tube. (*b*) It is more efficient. The disappearance of the exudate results from electrolytic action and not by mere pressure, as in other methods of dilating strictures, and consequently requires less force. There is, therefore, less danger of traumatism. The electrolytic bougie has been easily passed through strictures which were so firmly organized that it was impossible to pass a cotton bougie. (*c*) The results are more permanent. A stricture once removed by this method is permanently removed. The primary cause, acting again, may bring about its reappearance, but by careful attention to proper treatment a large percentage of the tubes may be kept patent. 7. The removal of obstructions in the Eustachian tube is only a large factor in and not the whole treatment of chronic tubal catarrh and chronic catarrhal otitis media. 8. The prognosis in any given case depends largely upon the amount of injury to tympanic structure. Where inflation is followed by marked temporary relief of deafness, subjective sounds or vertigo, one may expect brilliant results from the establishment of the patency of tubes. Where no temporary improvement follows inflation much may be accomplished, although the results are by no means so certain. The narrow tube should be opened, nevertheless, in every instance, with the hope of checking the advance of the disease. In a word, then, the writer wishes to make the points that (1) all narrow tubes should be restored to their normal calibre; and (2) where the narrowing is due to an organized inflammatory exudate, the best means of accomplishing this is by electrolysis.

A CRITICAL SUMMARY OF RECENT LITERATURE
ON THE
LOCALIZATION, DIAGNOSIS, PROGNOSIS, AND TREATMENT OF GONORRHŒA IN WOMEN.

By John G. Clark, M.D.,
PROFESSOR OF GYNECOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

(Continued from page 81, January, 1900.)

Localization. In their descriptions of the various localities which may become affected, Bumm and Klein in their monographs take up first the consideration of gonorrhœa of the urethra. The infection of this organ is so frequent that it may be considered almost without exception to be a characteristic of all acute cases. Bumm calls attention to the fact that the gynecologist seldom sees the cases of acute infection, because, as a rule, they consult the family physician or attend special genito-urinary dispensaries, or, as is frequently the case, let the process run on without treatment until the urethral gonorrhœa has disappeared and symptoms indicative of localization in the uterus or appendages arise. The gynecologist, therefore, as a rule, sees these cases in their later rather than in the acute stage.

One of the first signs in urethral gonorrhœa is a serous, transparent, yellowish secretion which at first contains only a few pus but many epithelial cells. Many of these epithelial cells are collected together in masses and between them many colonies of gonococci are seen. As a result of this desquamation of the epithelium the orifice of the urethra becomes reddened and often very œdematous, and the swollen mucous membrane frequently appears as an ectropion, from which a drop of greenish-yellow pus may be expressed.

The extension of the inflammation upward is, as a rule, rapid, and from day to day its progress may be determined by digital pressure upon the urethra and base of the bladder which elicits considerable pain. In the first days of the attack only the external portion gives rise to pain, later by digital expression a large quantity of yellowish, blood-tinged pus may be discharged.

As a rule, the symptoms in simply urethral gonorrhœa are at most very slight and fleeting in their character. In general, these patients complain of an unusual tendency to urination, and a feeling of irritation during and after this act. Urination is usually accompanied with excessive burning, especially when the surrounding epidermal areas are acutely inflamed by the irritating effect of the purulent discharge. All of these symptoms usually disappear quickly, and within three or four weeks, and frequently earlier, the mucous membrane returns to its normal appearance and the purulent secretion ceases.

According to Bumm, within six to ten weeks from the appearance of the acute attack the process has entirely healed itself. While the general tendency in these cases is to a complete healing, there are, nevertheless, cases in which the infection becomes chronic, and, notwithstanding the application of every remedy, persists for years. Such cases may easily be overlooked, because the symptoms are usually obscure.

Notwithstanding the apparent complete disappearance of the infection, the process may still be sufficiently active to transmit a virulent infection. On minute examination of these cases papillary excrescences of bright-red or grayish-red color may be detected. In the furrows between these caruncles the mucous membrane may be eroded and covered with pus and masses of epithelial cells. The urethral orifice may also show evidences of this condition in the ectropion of the mucous membrane, and the entire urethra may be thickened, and feels like a rigid tube underneath the finger. The urethral mucosa may be very greatly flattened, and shows in its entire extent a granulated or peculiar jelly-like appearance, or these areas may be more or less isolated and present a distinct contrast to the normal rosy color of the surrounding mucosa.

Near the glandular lacunæ within the urethra reddened areas which bleed lightly on touch may be seen, and in the purulent secretions from them gonococci may frequently be demonstrated.

In these cases it is not infrequent for the so-called gonorrhœal threads (tripper fäden) to be voided with the urine, which also contains gonococci. In the further progress of the case cicatricial contraction throughout the whole course of the urethra or its circular structures may occur; this, however, is much less frequent in women than in men.

Gonorrhœal inflammation of the epidermal surfaces of the external genital organs is always a secondary affection, and is not specific in its character, but of an eczematous nature, due to the irritation of the discharges. The skin surfaces of the perineum, the inner sides of the thighs, the labia, and the clitoris become reddened and very œdematous, and if absolute cleanliness is not observed small superficial ulcerated patches may form.

As a secondary result small condylomata are frequently noted. In many cases these growths are attributed by the inexperienced observer to syphilis, but unless there is a very characteristic syphilitic history they are much more likely to be of gonorrhœal origin.

Inflammation of the epidermal surfaces, as a rule, subsides in a few days without any sequelæ. In some cases, however, especially where cleanliness is not observed, it may become chronic and assumes a pruritic type. Sänger calls this vulvitis pruriginosa.

Bartholinitis is usually due to primary gonorrhœal infection. A tense, painful, fluctuant sac is frequently formed in the labium, which may be absorbed, or, as is frequently the case, ruptures on the surface. When this condition becomes chronic the gland is felt as a dense, hard body, and on pressure a small amount of purulent, milky or viscid secretion may be expressed from the common duct.

In chronic cases peculiar reddened spots mark the exits of Bartholin's ducts, which have been described by Sänger as maculæ gonorrhoicæ. In other inflammations, however, these maculæ may appear, and they cannot therefore be considered as absolutely characteristic of gonorrhœa.

Bumm differentiates between a pseudo-abscess, which is a simple accumulation of pus in Bartholin's duct resulting from the closure of the external orifice, and is a typical gonorrhœal product, and a true abscess due to a mixed infection which invades and destroys the ultimate acini of the gland.

A true gonorrhœal inflammation of the vagina is of rare occurrence, compared with that of the urethra and cervix. This is due to the fact, which has been pointed out in the description of the pathology of this disease, that the vagina is covered with stratified epithelium and possesses no glands. Inflammation of this organ is therefore not of a catarrhal nature but is a true dermatitis.

This inflammation may either occur as a diffuse reddening or as numerous reddened points.

Inflammation of the cervix, in point of frequency, is second to the urethra.

The first symptom noticed is a slimy, bloody secretion, which later assumes a milky or purulent character. As a result of the desquamation of the epithelium erosions of the cervix often occur.

Klein maintains that the majority of true erosions seen in gynecological cases are of a gonorrhœal nature.

As a result of the closure of the glandular stomata retention cysts (Nabothian follicles) are formed.

In the acute stage the mucous membrane of the cervix may become so congested and swollen that it projects as a sensitive, reddened, rosette-like growth from the os externum. Cervical gonorrhœa is especially prone to become chronic, and is the site of predilection for the so-called latent gonorrhœa, which may be most persistent and capable of transmitting an infection without, however, showing marked subjective symptoms.

In many cases gonorrhœa is limited to this area and does not pass the os internum. When it does a general fundal endometritis usually occurs.

In the acute stage there may be extreme tenderness over the uterus, especially on pressure, and if there is stenosis of the cervical canal agonizing uterine colic may be a prominent symptom. At first the uterine discharge is of a bloody, serous or purulent nature, but later is transformed into a slimy secretion. In chronic cases there may be a profuse and constant discharge of a viscid, catarrhal mucus. After the gonorrhœal process has invaded the fundus there is constant danger of its passing over into the Fallopian tube and forming an acute salpingitis which becomes more or less chronic and finally terminates in pyosalpinx. In natural order the pelvic peritoneum and the ovary ultimately may be involved.

The pathology of gonorrhœal inflammation of the Fallopian tube is extremely interesting, but is so extensive that space cannot be given to it in this review.

As symptoms of the invasion of the Fallopian tube, the patient complains first of sharp pain in one or both ovarian and tubal regions, which is greatly increased by bimanual examination.

All physical movements, such as dancing, riding, walking in rough places, etc., increase the pain very much. Rest in bed may give almost complete relief from these symptoms. With the first appearance of the acute pain the temperature may rise 1° or 2° F. above normal. In the chronic stages the symptoms become persistent, and the patient may be a constant sufferer for years, being simply able to drag about but never well. Inflammation of the ovary and peritoneum may be looked upon as secondary to tubal gonorrhœa, and is probably due to the irritation of the toxins rather than to the specific action of the gonococci.

Considerable dispute has arisen as to the question of a gonorrhœal metritis, Wertheim, Klein and others claiming that this may be secondary to endometritis, while Bumm states unreservedly that rarely if ever do the gonococci penetrate below the limiting membrane of the mucosa.

DIAGNOSIS. The diagnosis of gonorrhœa in women is much more difficult than in men, chiefly because a whitish, leucorrhœal discharge may be considered more or less normal in women, whereas in healthy men there is no urethral discharge. The mere fact that a man has such a discharge is very strong presumptive evidence in favor of its specific origin, whereas no significance may be attached to a leucorrhœal discharge in women.

The certain diagnosis of gonorrhœa in women depends very largely upon the demonstration of the gonococcus in the secretions. A profuse purulent urethral discharge is quite as diagnostic as it is in men, but when we take into consideration the fact that the acute urethritis is comparatively fleeting in its character, and that the disease may persist months and even years after all of these symptoms have completely disappeared, it will be seen that little importance can be placed upon this sign. Its presence is of great diagnostic value, but to assume because of its absence that there is no gonorrhœa would be a serious error.

In the chronic process it may be possible to express a small amount of purulent matter from the urethra or from the ducts of Bartholin's glands, but this also may be absent. In the diagnosis of chronic vulvitis, vaginitis, cervicitis, endometritis, and salpingitis the clinical symptoms are by no means pathognomonic. When there is profuse yellowish discharge from any one of these organs it is presumptive evidence in favor of this disease, but even then a positive diagnosis cannot be made. The most certain method, therefore, is the demonstration of the gonococci in the secretions.

In securing the pus for this examination the greatest precaution should be observed not to have it contaminated by other organisms. For bacteriological examination the vaginal discharge is almost valueless, because it contains as a rule such a large number of cocci and other bacteria. Secretions from concealed passages are the ones which are to be employed in a microscopical diagnosis. The urethra should be exposed, carefully cleansed with a mild disinfectant solution, and with the platinum loop the secretion should be withdrawn and placed upon a cover-glass; if there is no urethral secretion it may be possible to express a drop from Bartholin's duct. The cervix should always be examined, and to this end the Sims posture, which permits its complete exposure, should be employed. Secretions obtained directly from the cervical canal are the most reliable, for when gonococci are demonstrated in them there is no longer any doubt as to the diagnosis.

For clinical purposes methylene-blue solution is a practical and easily manipulated staining fluid. The secretion may be spread out on the cover-glass or on a slide, the latter being usually the better. If it is very small in amount or rather thick and viscid, it may be diluted slightly with a drop of normal salt solution. After spreading it evenly, it is dried by passing it a few times over the flame of an alcohol lamp or gas-burner. Methylene-blue solution is then dropped upon the slide and allowed to remain for one-half to one minute, and is then carefully washed off in running water and dried with bibulous paper or with a clean, white handkerchief. It is not necessary to protect the stained area with a cover-glass, for it may be inspected directly either with a high-power or (which is always preferable) with a one-twelfth oil-immersion lens.

To be certain of the diagnosis the gonococci must be found inside of the pus cells. While the presence of typical biscuit-shaped cocci in pairs free in the secretion without the association of other bacteria is very significant, it is nevertheless unsafe to make a positive diagnosis. One should never be content with one search, for gonococci may be found in a certain number of cases only after repeated examination. In one instance which I recall at least twelve negative examinations were made on different days before the gonococci were at last found; in this case the history and the symptoms so strongly pointed to gonorrhœa that the examination was not abandoned until we were finally rewarded by finding a very large number of intracellular micro-organisms.

Again, as to the question of the diagnosis being established in this way there has been considerable dispute, but there is now a general consensus of opinion as to its value. In some instances in which I have been unable to find the gonococci even after repeated examination the symptoms have been so characteristic that I have felt justified in making a tentative diagnosis of gonorrhœa under the assumption that the micro-organisms were concealed.

PROGNOSIS. Although the result of gonorrhœal infection in women may be of the most serious nature, and, indeed, this is so frequently the case that one is almost inclined to say that all cases are serious, nevertheless the fact must not be lost sight of that a considerable proportion of cases run a simple, mild course, and with the exception of a more or less acute urethritis or vulvitis no other part of the genital tract is involved.

Quite correctly Bumm claims that one cannot arrive at a proper conception of the ravages of this disease without having further statistics from which to draw conclusions. This undoubtedly is the proper attitude to assume, for the gynecologist is very much more likely to see the serious cases, whereas the simple cases either are treated successfully by the general practitioner or recover without treatment.

It has been generally stated by Continental statisticians that this disease was much more frequent in New York and other large American cities than in the European cities. For instance, Noeggerath, to whom this impression is referable, claims that in New York of every 1000 men at least 800 suffer from this complaint; and also further makes the absurd statement that of this number at least 90 per cent. are married men, and concludes by saying that of every five married women at least three have become thus infected.

These statements are unquestionably exaggerated, and I cannot imagine from what source this writer has drawn his statistics. Bumm, however, states that Noeggerath has made a mistake, and that in later years he has become convinced of it, and has retracted his statement.

According to E. Schwarz, in the larger cities of every 100 married men ten have chronic gonorrhœa, whereas ten others acquire a subsequent attack in the course of their marital life. As a result of this condition five of the 100 married women become infected. In a general way this coincides with the observations of Sänger, who found among 1930 gynecological cases treated in his private and public clinic 230, or 10 per cent., suffering from the effects of this disease. In a later series of cases, of 161 women who were carefully examined twenty-nine, or 18 per cent., were found infected. According to Zweifel, 10 to 11 per cent. of private patients consulting him are sufferers from this disease. In the Heidelberg Obstetrical Clinic, of 108 pregnant women who were carefully examined, in thirty (27 per cent.) gonococci were found. Schwarz, also, in 1617 pregnant women found this organism in seventy-seven cases, and Lomer, in Schroder's clinic, nine times in thirty-two cases.

The frequent occurrence of gonorrhœa in the pregnant state shows that this disease is not so invariably followed by sterility as is generally stated, for unquestionably a large number of these patients have been the subjects of a chronic infection which is merely lighted up and becomes active during the pregnant state.

Accepting that on an average 12 per cent. of all marriages are sterile, it may be admitted that at least 8 per cent. of these are due to gonorrhœal infection. In considering the question of sterility, both sides of the marital house must be taken into consideration, for the husband rather than the wife may be sterile as a result of this disease.

In women, so far as the question of prognosis is concerned, the localization of the pathological process is the deciding feature. According to the statistics and experience of such men as Bumm and others, in acute gonorrhœa of the urethra and cervix the prognosis is favorable, for, notwithstanding the absence of all treatment, many of them are completely healed. In comparatively few instances is the entire genital tract infected, and when this occurs it is usually due to insufficient treatment, active exercise at the time of the menses, sexual excesses, and, above all, the repeated infection of the wife by the chronically diseased husband. So long as chronic gonorrhœa exists in the husband the treatment of the wife is absolutely useless. If the infectious process at last gains access to the uterus and becomes chronic the prognosis as to a complete cure is doubtful, for notwithstanding the most approved treatment it is sometimes impossible completely to eliminate the gonococci from the endometrium. After the greatest pains are taken to relieve this condition the symptoms may disappear for a time and the physician congratulates himself that the patient is at last well, when suddenly without any premonition the chronic process recurs, and again the patient suffers from the same symptoms as before.

Notwithstanding the fact that the relief of symptoms and cure of the patient after the onset of tubal gonorrhœa is held by many gynecologists to be practically impossible, Bumm, Freund, Sänger and others take a more conservative view, and claim that while it is not likely that the tissues may be restored to their former integrity, nevertheless, even after a considerable quantity of pus has formed, it may become absorbed and the patient may again be completely relieved so far as any disagreeable symptoms are concerned. Certainly, to accomplish this end the greatest pains and care in the treatment of the case should be exercised.

According to the present status of our knowledge we can with perfect propriety try conservative methods of treatment even in gonorrhœal pyosalpinx before resorting to operation. In rendering a prognosis in these cases, the probability of an ultimate operation should very carefully be explained to the patient or to her friends in order that bitter disappointment may not be felt when it is found after careful antiphlogistic treatment that this course is absolutely necessary.

TREATMENT. Concerning the treatment of this infection there are two opposing views: one holding that absolutely nothing should be done in the way of local therapeutics, with a view to the self-limitation and self-healing of this disease, while the opposite insist that active germicidal remedies are indicated from the very onset.

The first view is based upon the fact that gonorrhœa in its acute stage is practically always confined to the lower genital tract, and as has been shown in the consideration of the pathology of this question, frequently does not tend to extend beyond these areas. Those writers, therefore, who take the position that no local therapeutic remedy should be employed do so because they fear that through the application of remedies in the form of douches, local ointments, vaginal suppositories, etc., the gonococci may be carried from the lower into the higher genital tract, and thus leave the patient in a worse condition than were nothing at all done. This view is taken by such eminent authorities as Bumm, of Basel, who has, as I have already stated, gone very thoroughly into the question of the pathology, bacteriology, and treatment of gonorrhœa, and by Behrens, the chief examiner of prostitutes in Berlin.

On the other hand, Neisser, who is equally eminent as an authority, not only because of his discovery of the gonococcus but also because he, too, has had quite an extensive experience in treatment, claims that the moment the infection is detected active germicidal treatment should at once be instituted.

The conservative treatment consists in absolute rest, because, as stated by Bumm, the various movements of the body in walking and other physical exercises may cause a dispersion of the infectious matter from its primary seats to the upper genital tract. He especially advises that absolute rest in bed shall be enjoined during the menstrual period, at which time the spread of the infection is much more likely to occur than in the menstrual interim.

In his protest against local treatment, the question is asked by Bumm how often is a urethral gonorrhœa transmitted to the cervix, and thence to the uterine cavity, through instrumental manipulation employed in the treatment.

As in all disputes of this nature, there is possibly a midway position which may safely be maintained. For instance, in the acutely infected individual, suffering with considerable purulent discharge, limited to the external opening of the urethra and vulva, it would indeed be bad policy to allow the discharge to continue without applying cleansing and local bactericidal treatment, just as in all infectious processes. Cleanliness is the first desideratum, and really in the majority of cases is no doubt the only measure upon which special stress should be laid.

The introduction at this stage of douche nozzles into the vagina and the urethra are, however, unquestionably reprehensible, unless very carefully conducted by a trained nurse or by the physician himself. To place these remedies in the hands of the patient is very dangerous, simply because, as ordinarily carried out even by very intelligent individuals, the vaginal douche may be the means of transporting the gonococci from the vulva to the cervix. Above all things to be avoided in gonorrhœa is this extension, for if the micro-organisms once gain access to the uterus we may in the natural course of events look for a prolonged and possibly a chronic course of the disease, which sooner or later terminates in pyosalpinx and more or less extensive perioöphoritis and pelvic peritonitis.

In rare cases in the adult the injection of warm water, or a 1 per cent. solution of ichthyol, as advised by Bumm, with daily sitz baths and cleansing of the outer genitals with a 1 : 1000 solution of bichloride of mercury may be advised.

For the treatment of the secondary eczema of the adjacent epidermis lanoline or a mild fatty ointment, to which some simple astringent is added, is of service.

If at the end of four to six weeks the infectious process passes over into a subacute stage in which the hyperæmia of the mucous membrane increases and the secretion becomes of a slimy, milky consistency, then, according to Bumm, local applications may very successfully be instituted. As in all conditions which are difficult to treat, so in gonorrhœa innumerable remedies have been suggested, some of which have proved of value, but the great majority have been absolutely ineffective.

According to Bumm, the remedies which are based on bacteriological experiment for their inhibiting effect are absolutely worthless in the treatment of subacute and chronic cases. The closest possible knowledge of the localization of the infectious process and a systematic microscopical control of the case are necessary. In men only the complete disappearance of the discharge may be taken as evidence of complete healing, but in women a certain amount of discharge is normal.

All gonorrhœal processes are finally healed through the natural reaction of the infected tissues against the organism; without this assistance a complete elimination of the gonococci is impossible. The most unfavorable cases, therefore, are the chronic ones, in which the tissues have become accustomed to the presence of the gonococci and the epithelium of the mucous membrane, as a result of long-continued irritation, has changed from a columnar to a stratified pavement variety.

As has been seen in the foregoing review, acute gonorrhœa, at least of the external genital organs, is distinctly self-limiting in its course. The chronic cases tend to become localized, and frequently small infected areas will be overlooked, and a patient may be pronounced cured who is still capable of transmitting the infection.

Concerning treatment, Bumm, Klein, Sänger and others quite properly lay stress upon the necessity of first discovering the point of localization, and then directly applying topical remedies. In acute urethritis no treatment in the way of injections should be employed; if, however, the inflammation runs into a subacute form, silver nitrate, 1 : 1000 solution, or ichthyol, 1 : 5 to 100, injected into the urethra is frequently very efficacious. Unless great force is used in the injection there is little danger of the fluid entering the bladder, and even in this event no serious trouble will be caused. The use of ichthyol in the treatment of gonorrhœa is comparatively recent, but I am sure that it will appeal to all as thoroughly rational who have had occasion to use it for superficial inflammatory conditions. Neisser, after having thoroughly tested the value of the various silver salts, has at last settled upon this remedy as being superior to all others; and in this opinion he is sustained by Jadassohn and Bumm. Jadassohn has also very strongly advised the use of argonin, a silver preparation, in 1 or 2 per cent. solution, which has the advantage over the usual silver salts in that it does not produce irritation. The older remedies, such as the copper, zinc, and lead salts, are much less employed than formerly, because they have been superseded by remedies which act more efficaciously and with less danger of disagreeable sequelæ. Although balsam of copaiba as an internal remedy has no special germicidal action, nevertheless Bumm advises it upon empiric grounds, and claims to have had surprisingly good results from its use in some cases. This expression I am certain is in accord with the opinion of many practitioners who look upon this remedy with great favor.

In chronic urethral gonorrhœa the endoscope should invariably be employed to locate the inflamed areas, which may then be treated with a 20 to 50 per cent. silver nitrate solution, or with a galvano-cautery. By means of the latter instrument the chronic areas of infection are effectively destroyed and are substituted by a healthy granulation tissue.

In the topical treatment of the vulva and vagina a 1 to 10 per cent. silver nitrate solution applied through the speculum is of great value. Under its effects the reddening and swelling frequently disappear very rapidly. When the follicular areas of the vulva or Skeen's glands are inflamed the galvano-cautery may be employed as above described.

In the treatment of inflammation of Bartholin's gland hot applications may sometimes be of service, but, as a rule, complete extirpation is advisable, for when the gland once becomes the seat of chronic infection it will not, as a rule, give way to any form of treatment but persists as a source of continued infection.

As has been indicated in the consideration of the pathology of gonorrhœa, when it once gains access to the uterus it is exceedingly obstinate in its course, and may continue for years without any tendency to self-cure. It is sometimes a difficult question to determine whether the cervix alone or in conjunction with the entire uterus is infected. If there are no symptoms pointing to infection of the fundus uteri, treatment should be directed alone to the cervix. To this end the os uteri should be well dilated, and it may be necessary in nullipara to make a bilateral discission. After having thoroughly cleansed the mucous membrane, silver nitrate in 1 to 5 per cent. solution should be applied until the mucous membrane becomes overlaid by a white coagulum. Ichthyol in 5 to 10 per cent. solution may also be applied on cotton or on a small strip of gauze, and left *in situ* for many hours. This is perhaps one of the best remedies.

If this line of treatment is patiently carried out, a cure in the majority of cases may be effected; but unfortunately it is at best slow, and both patient and physician may lose courage and give up the attempt. If good results are not effected in this way and gonococci persistently reappear in the secretions or when the symptoms of endometritis become so prominent that one is forced to the conclusion that the uterine cavity is generally infected, local treatment of the fundal endometrium may safely be begun. This, however, should be carried out with the greatest precaution, for it is very easy to cause a transferrence of the gonorrhœal process from the uterus to the tubes, which is yet a more serious involvement.

When, notwithstanding the greatest care in the treatment of the endometritis, or in the natural course of the disease, the infectious process passes over into the tube the treatment should consist of absolute rest in bed, cold or hot applications to the abdomen, careful regulation of the bowels, and light diet. Rest during the acute infection is one of the chief points in the treatment. Notwithstanding the fact that the symptoms may disappear and the patient may be relieved completely of pain, she should not be allowed, even though importunate in her petitions, to at once get upon her feet, for the infectious process may again become active.

Bumm states that when the tubes become acutely infected the patient should remain two months in bed, and may only be allowed to get up after the pain has ceased and the temperature has been normal for a full month. Upon the course of the first attack the future of the patient very largely depends, for if at this time pus does not collect in the tube, and the pelvic peritoneum is affected only to a limited degree, the prospect for healing is good ; if, on the other hand, the patient is allowed to go about too soon, and there is a recurrence of the disease, a pyosalpinx may result, and the peritoneum will then become further involved. In insisting upon the cessation as far as possible of all bodily movements, and with persistence in the antiphlogistic treatment, the patient may entirely recover. Certainly the wider becomes our experience in tubal infections the more we are convinced that even pyosalpinx when properly treated may subside and leave the patient, so far as her symptoms are concerned, absolutely well. Of course, it is not conceivable that the tissues and organs can be restored to normal, for the majority of these patients remain permanently sterile, showing that there has been a radical organic impairment.

After the gonorrhœal process has invaded the tubes all forms of uterine treatment should be stopped or conducted with the greatest precaution. To avoid possible danger it is unquestionably better to err on the side of not treating at all than to carry it out too vigorously, with its attendant danger of increasing the disease of the tubes. When the tube is converted into a pyosalpinx and persists, notwithstanding its careful conservative treatment, operation must be advised.

Upon the methods of operating in these cases there is a distinct disagreement, in that such an eminent authority as Bumm claims that the total removal of the tubes, uterus, and ovaries is the only advisable course, whereas other gynecologists quite as vigorously claim that only the actually involved tubes must be removed, leaving behind the ovaries and uterus. Personally, I am strongly inclined to the latter view, for while the convalescence admittedly is not so satisfactory and the possibilities of a continuance of the process are greater, nevertheless a considerable proportion of these cases are completely healed and have no further trouble. The fact that gonorrhœa is much more likely to occur in young than in older women causes me to incline very strongly to the conservative line. I have seen both plans of treatment carried out, and this opinion, therefore, is largely based upon actual experience. Total hysterosalpingo-oöphorectomy is an operation which should never be performed in the young woman if there is any possibility of avoiding it, even though the convalescence of the patient may be slower, and the dangers of a recurrence are greater when treated otherwise.

The treatment of gonorrhœa during pregnancy consists in the maintenance of absolute cleanliness, for to attempt to institute curative remedies at this time is fruitless. Vaginal irrigations should be given daily, but according to Bumm should be stopped about one week before the expected confinement. On account of the dangers of infection of the child's eyes during parturition, the most vigorous means should be employed to prevent this serious complication. Irrigations after labor has begun and the greatest care in the treatment of the infant's eyes immediately after birth are the best prophylactic means for the prevention of ophthalmia neonatorum.

As a result of this review of the treatment of gonorrhœa, it is quite evident that absolute rest in the acute stages of the infection is one of the most important essentials. The second point which is brought out is that the silver salts, notwithstanding the fact that they have been very largely condemned by a number of writers, still maintain a very important place in the treatment.

Thirdly, that of the more recent remedies which have been suggested, ichthyol unquestionably is the most valuable, because it is non-irritating, is very effective in alleviating pain and reducing the inflammation, and absolutely free from any disagreeable sequelæ, such as are occasionally noted after the use of the more irritant remedies.

A point also upon which special stress should be laid is that the principle of immediate germicidal treatment in acute cases, as insisted upon by Neisser, appears more judicious than the conservative plan employed by Behrens and others.

REVIEWS.

A MANUAL OF DISEASES OF THE NOSE AND THROAT. By CORNELIUS G. COAKLEY, M.D., Clinical Professor of Laryngology in the University and Bellevue Hospital Medical College, New York City. Illustrated with 92 engravings and 2 colored plates. New York and Philadelphia: Lea Brothers & Co.

IT is a pleasure to find a book which amply fulfils the purpose for which the author states he has written it. Dr. Coakley explains in his preface that his book is intended to meet the needs of the student and the practitioner, and we know no book of a similar nature which will better fill their wants. The author has had large experience as a teacher, and evidently appreciates the value of placing himself in the position of those who will use his book, and writes from their point of view as well as that of one thoroughly a master of his subject. The grouping of the various topics is such as to render the book convenient for reference in looking up particular points, and being written in a very concise yet readable style, it takes but a few moments to comprehend the essential facts under discussion. There is a refreshing absence of references to the divergent views held by different authorities on the same subject. There is no attempt made to furnish students with elaborate bibliographical and historical details which are of no practical value. The various operative procedures described are those which are most generally used, and the mind is not confused and distracted by accounts of modifications introduced by other operators, usually in a vain attempt to do something original whereby to perpetuate their names. A large proportion of space is given to the technique of examination of the nasal cavities and the throat, and this is one of the traits which especially commends the book. To those who devote the principal part of their time to work in laryngology or rhinology such details may be unnecessary, but to the beginner or one unfamiliar with the subject nothing can be of more importance than a knowledge of how to perform such manipulations correctly. The author has also very wisely devoted much space to the differential diagnosis of the lesions met with in the nose and throat. Thus he does not content himself with saying that the diagnosis of a polypus from a papilloma or a malignant growth may be difficult, but goes into the points whereby the diagnosis may be established in a special section of the article on the subject under discussion. In fact, this attention to diagnosis is so prominent as to be almost a unique feature in a work of this character. The book is thoroughly up to date in every way, presenting, however, not the latest theories but the latest facts The author expresses his confidence in the antitoxin treatment of diphtheria, and gives an excellent *résumé* of the best methods of applying it The book contains many illustrations, most of them taken from standard works on the nose and throat, some of them original. The volume is very compact, but the print and paper are most excellent, and render the book very attractive. There is also a very complete index, which adds greatly to its usefulness. Dr. Coakley's book we regard as one of the most concise yet comprehensive epitomes of laryngology and rhinology that has ever been written. It is certain to come into immediate popularity with teachers and students. F. R. P.

A Text-book of Diseases of the Nose and Throat. By D. Braden Kyle, M.D., Clinical Professor of Laryngology and Rhinology, Jefferson Medical College, etc. With 175 illustrations, 23 of them in colors. Philadelphia: W. B. Saunders, 1899.

This book contains many strikingly original features, which place it much above the average of the text-books which come forth in such unceasing stream. The author has elaborated a system of classification for the morbid conditions found in the nose and throat which possesses great merit for its originality and as an effort to place the study of such conditions on the basis of a rational pathology. With the exception of the work of Lennox Browne, most of the attempts at a systematic classification which have heretofore been made have rested almost solely on clinical evidence or on the crudest kind of pathological study. Dr. Kyle's classification is, as we have said, original and in many instances differs strikingly from our preconceived notions, but he supports his views in most cases with incontestable evidence. He has worked for many years conscientiously with his microscope, and now puts forth the result. Another pleasing feature is the systematic arrangement of his subject-matter, whereby the study of any particular portion of the work is much facilitated. For instance, we find, under each subject admitting of such treatment, first, the synonyms, then the author's definition, a discussion of the etiology and pathology of the lesion, the symptoms, diagnosis, prognosis, and, lastly, the treatment. The system which pervades the book is also illustrated by the tables placed at the opening of each chapter. This arrangement is worthy of note, as it enables one to not only learn what are the contents of an individual chapter at a glance, but also to know the relation occupied by various morbid conditions to one another, according to the author's views. The book is particularly adapted to meet the needs of those who are making a special study of rhinology and laryngology. The detail with which it goes into every subject and the accuracy of its descriptions will render it of great value to those who wish a guide to help them in their practical work. Much attention is given to the constitutional disturbances which underlie many of the local disorders which manifest themselves in the nose and throat. Dr. Kyle does not content himself with saying that "tonics are indicated" or that "the constitutional condition should be rectified," but goes into the matter and states what he considers the best tonic or alterative or what the most necessary hygienic regime indicated under the circumstances. The author has a pleasing style, and writes with a zeal and enthusiasm for his subject which are very attractive. It is rare to find any book possessing the wealth of illustrations to be found in Dr. Kyle's, and rarer yet to find such a large proportion of original illustrations. Many of these are executed from specimens prepared by the author, and one can but be struck with the accuracy of the pictures they convey. Some of them are particularly worthy of note, such as those which illustrate the difference in structure which exists between the soft faucial tonsil and the same organ after it has become fibrous from chronic inflammation, or between the soft and the fibrous adenoid, and the plates illustrating the microscopical alterations undergone by the tissue in atrophic rhinitis. We think Dr. Kyle's book is destined to take its rank as an authority on the subjects whereof it treats, and to stand with the books of Lennox Browne and Bosworth as one of the most essential works of reference in laryngology and rhinology.

F. R. P.

DISEASES OF THE HEART AND AORTA. By GEORGE ALEXANDER GIBSON, M.D., D.Sc., F.R.C.P. Ed., F.R.S.E. With 210 illustrations. Edinburgh and London: Young J. Pentland. New York: The Macmillan Co.

IN 1705 Hook wisely suggested, "Who knows but that one may discover the works performed in the several offices and shops of a man's body by the sounds they make, and thereby discover what instrument or engine is out of order?" This seed bore sadly little fruit in a century. One learned author, for example, writing in 1801 for Sampson, Low & Co.'s *Encyclopœdia,* included all cardiac affections under the title "*Palpitatio*" (palpitation of the heart), and very curtly stated that this trouble was due to two general causes: organic change in the heart itself and outside affections, such as dyspepsia. If the difficulty were the result of one of the latter class of causes, treatment directed to the origin of the evil was likely to relieve it. If it were organic nothing could be done. The actual determination that the trouble was organic remained, as we know, purely speculative so far as concerned definite methods of diagnosis, particularly auscultation. At the beginning of another century, however, the sounds made by the "instrument or engine" have long been old friends, and the great danger has come to be a tendency to attribute too great an importance to variations from the normal sounds and to rely upon small distinctions in these in differentiating the various lesions. While Dr. Gibson's work is comprehensive in most ways and in many parts is very admirable, the portion devoted to the valvular lesions, the most important division of the book, is worthy of least praise. There have been many valuable recent additions to the formal literature dealing with diseases of the heart, and wise and conservative authors are wholly decided in their teaching that dependence upon the characters of murmurs alone is usually a very shaky method of establishing a diagnosis. It must, therefore, arouse some surprise when one sees it stated here that a systolic murmur in the aortic region transmitted into the vessels of the neck is almost sufficient to establish a diagnosis of obstruction at the aortic orifice. Fifty years ago Walshe wrote: "The murmur of chronic aortic constriction is one of those open to the greatest number of imitations," and we prefer to accept even such ancient teaching which still, we think, remains true; to be told that the pulse is of very little value in the diagnosis of aortic obstruction is also unexpected. And while there may be a justifiable difference of opinion concerning the existence of a physiological tricuspid incompetence, there is no question that nowadays most students of diseases of the heart demand better evidence of this lesion than a murmur of peculiar character and distribution, while Dr. Gibson states that the determination of the position of maximum intensity of the murmur "overcomes every difficulty in recognizing its significance." A similar dependence upon slight differences in murmurs is shown in the teaching that a "presystolic or diastolic murmur with its maximum intensity in the tricuspid area must be allowed to be pathognomonic of obstruction of the right auriculo-ventricular orifice." It is true, though surprising, that this view is held by a number of other prominent British authors, but the evidence offered by them or by Dr. Gibson is merely the observation of a few cases—some of them during life only, others at the post-mortem table as well, in which this sign was, or was believed to be, associated with this lesion. This certainly does not constitute proof that the murmur is pathognomonic, and, indeed, it is hard to convince one now that any localization or transmission of a murmur may be said to be pathognomonic, particularly of lesions so difficult to diagnose as is tricuspid obstruction. To instruct one's readers to depend very largely upon murmurs in making a diagnosis seems narrow and somewhat antiquated. Other signs of the mechanical effects of a lesion must be found before any diagnosis can be positively made.

The sections upon diagnosis in this part of the book are unsatisfactory in several instances. As an example it may be noted that it is stated that the diagnosis of the existence of mitral incompetence is always an easy matter. The only point apparently considered to be of diagnostic importance is the determination whether there is a primary valvular lesion or regurgitation as a result of relaxed walls. Accidental murmurs are not discussed in this connection, difficult as it is oftentimes to distinguish them from those due to organic incompetence, and though the condition of the right heart and of the second pulmonary sound receive mention under symptomatology they are not insisted upon as characteristic changes almost essential to a diagnosis, and it seems strange to leave one unconvinced of their importance. There are many things, however, of great interest and value in this division of the book. The symptomatology and etiology particularly are discussed in a very interesting way, and the pathology is adequately treated.

Congenital diseases of the heart are considered at moderate length only, and Dr. Gibson wisely does not encourage one to indulge in speculative diagnoses of the more obscure forms. The diseases of the myocardium are presented in a very admirable way. We must assent with the view expressed, that it is irrational to divide angina pectoris into true angina and pseudo-angina. The closing chapters on diseases of the aorta are extremely instructive and interesting, and are followed by a magnificently large and carefully prepared bibliography.

There is a large amount of valuable material in the book, much of which is derived from Dr. Gibson's own experience and labor. It tends, however, toward teaching one to diagnose cardiac conditions rather from the stand-point of clinical observation than from a consideration of the pathological changes in the heart and the resulting mechanical disturbances, and one feels that he has gained interesting ideas from reading the work rather than that he has been put upon a solid basis in formulating an exact diagnosis. D. L. E.

A CONTRIBUTION TO THE SURGERY OF FRACTURES AND DISLOCATIONS OF THE UPPER EXTREMITY BASED UPON AN ANALYSIS OF ABOUT SEVEN HUNDRED CONSECUTIVE CASES OBSERVED AT THE MANCHESTER ROYAL INFIRMARY. By J. E. PLATT, M.S. (Lond.), F.R.C.S., Honorary Surgeon to the Hulme Dispensary; Surgical Officer to the Cancer Hospital, Manchester; late Resident Surgical Officer to the Manchester Royal Infirmary. Illustrated by 23 drawings and skiagrams. London: H. K. Lewis, 1899.

THIS little book, while modestly styling itself a contribution to the surgery of the subject, really rises to the dignity of a treatise. Besides an analysis of the cases observed by the author, he has gone over a great deal of the literature, and embodied in the book the opinions of many writers, so that it is to some extent a critical summary of the anatomy, etiology, diagnosis, and treatment of these injuries, and this feature, in connection with the references furnished at the end of each section, will be of considerable value to the busy surgeon. There are numerous tables carefully compiled, the skiagrams have the merit of showing clearly what they are intended to show, and the author's style is terse and pleasing. The methods of treatment recommended are, as a rule, similar to those popular with American surgeons. Full justice is not done to the treatment of fractures of the lower end of the humerus in the position of extension, a method we believe to be useful in some cases, and treatment of these same injuries by acute flexion, according to the methods of Jones and Smith, is mentioned without comment. We believe Stimson's dressing for upward dislocation of the outer end of the clavicle would prove more satisfactory than the devices described. But the book, on the whole, is a worthy addition to the literature, and we believe will meet with hearty commendation of surgical practitioners. J. H. J.

NOTES ON THE MODERN TREATMENT OF FRACTURES. By JOHN B. ROBERTS, A.M., M.D., Professor of Surgery in the Philadelphia Polyclinic; Mütter Lecturer on Surgical Pathology of the College of Physicians of Philadelphia. With 39 illustrations. D. Appleton & Co., 1899.

THE study of fractures has always offered peculiar attractions to surgeons of an original and mechanical frame of mind. At the same time in probably no department of surgery has conservatism been more firmly rooted. In this field of practice, in which the laity and the profession unite in fixing the responsibility on the surgeon, the weight of authority has been the prop of many of the practices and beliefs handed down from the fathers of the profession. This little book, which is a collection of essays published at various times in various phases of the subject, is at the same time a plea for simplicity and common-sense in the management of this class of injuries, and an argument in favor of some of the newer methods of treatment, such as tenotomy, open incision, the author's method of subcutaneous nailing, etc. Two of the older papers here published, and evidently written some years since, viz., those on refracture for the relief of deformity and fracture of the cranium, are devoted to the defence of opinions now generally accepted, time having justified the author's position. Other chapters deal with the prevention of deformity—the treatment of fractures of the lower end of the humerus, in which the author approves of the treatment in the extended position, a method too little known, and the treatment of fractures of the lower end of the tibia and fibula. A considerable portion of the book is devoted to the consideration of fracture of the lower end of the radius, a subject to which the author has given much attention, and on which his views are well known. The points on which he lays most stress are early, forcible, and accurate reduction, and the application and early removal of simple dressings as elements of prime importance in the avoidance of deformity and disability, which his experience has convinced him are frequent sequelæ of the ordinary methods of treatment. The book is a thoughtful and suggestive one, and will be read with much interest by students of surgery. J. H. J.

OPERATIONS ON 459 CASES OF HERNIA IN THE JOHNS HOPKINS HOSPITAL FROM JUNE, 1889, TO JANUARY, 1899. THE SPECIAL CONSIDERATION OF 268 CASES OPERATED ON BY THE HALSTED METHOD, AND THE TRANSPLANTATION OF THE RECTUS MUSCLES IN CERTAIN CASES IN WHICH THE CONJOINED TENDON IS OBLITERATED. By JOSEPH C. BLOODGOOD, Associate in Surgery, Johns Hopkins University, and late Resident Surgeon, the Johns Hopkins Hospital. From the Johns Hopkins Hospital Reports, Vol II.

THE great improvements in the results of operations for the radical cure of hernia, improvements which have placed on a firm basis a procedure which until recent years has been looked upon with distrust by conservative surgeons, have been mainly due to two factors, viz., the introduction of asepsis and an appreciation of the mechanical problems to be met and solved. To these may be added as a third factor a painstaking attention to detail in every stage of the operation, an attention which considers every step in the technique to be worthy of the closest scrutiny and study. In the minds of many the Halsted and Bassini methods, the favorite ones in this country, and which appeared about the same time, are considered practically the same, but Halsted claims that the features in which his operation varies from that of Bassini are essential points of difference, and we think a careful scrutiny of this elaborate report before us bears out this claim. Certainly, where altered or modified there has been corresponding variation in the results. The Halsted operation, as modified by its originator and by his assistants, is not identical with that published ten years ago, and the improvements are due to careful attention to what might be easily considered unimportant details did not a study of the statistics show the marked influence they have had on the final results. This report comprises a description and history of the operation, and of all the modifications it has undergone, and a statistical record of the cases operated upon, the cases being divided into groups according to the variety of hernia and method of operation for better analysis and study. The division and subdivision employed is sometimes a little confusing. There are special sections on the contents of the sac in inguinal hernia, the relation of the sac to the cord, the age of the patients, strangulated hernia, operations under cocaine anæsthesia, and operations for umbilical, ventral, and femoral hernia; also on allied subjects—hydrocele, varicocele, and castration. Much care has been taken to follow up the cases and learn the ultimate result, and by this method to obtain statistical proof of the value of the improvements in technique, the most important being excision of the veins of the cord, the substitution of silver wire for silk in the buried sutures, the use of rubber gloves by both operator and assistants, and the transplantation of the rectus muscle in cases in which the conjoined tendon is poorly developed or is obliterated. In summing up the results of operation for the radical cure of hernia, the author estimates the mortality as less than 5 per cent. Prevention of recurrence is assured in all femoral and in most ventral and umbilical hernias, and in more than 96 per cent. of the inguinal variety. The results have been exceptionally favorable in children, an experience coinciding with that of Bull and Coley, who employ the Bassini method. Coley, who disapproves of the Halsted method, has reported in one paper 160 operations for inguinal hernia by the Bassini method, with no recurrences, but his cases were not followed for the same length of time as these have been, and were largely among children. The problem offered by excision of the veins of the cord seems to have been one of the most difficult of solution. There is no doubt as to its value in preventing recurrence at least in this method, although its utility has been denied except when the veins are varicose, by the upholders of the Bassini operation, but the fact that it is followed in a large percentage of cases of epididymitis and in a small number by atrophy of the testicle is one the author has not been able to overlook. He himself states that the results of the experiments of Griffith on dogs have led him to believe that the function of the testicle may be destroyed by the ligation of the vessels of the cord without macroscopic atrophy, and advises, therefore, against excision of the veins on both sides in either hernia or varicocele, and adds that excision is contraindicated in children. The solution may be found in excision of the veins without transplantation of the cord or in transplantation of the veins alone. The use of rubber gloves in this, as in all operations, seems to be the most satisfactory means of avoiding the apparently impossible task of absolute sterilization of the human skin. The experience at Johns Hopkins with silver wire seems more fortunate than in many places where non-absorbable sutures have been used. It has certainly proved far superior to silk. Cushing's method of dealing with the undescended testicle by replacing it in the abdominal cavity is a brilliant device, and has yielded excellent results where employed; but as much cannot be said for disposal of the normal organ in this manner, as it seems to have an unconquerable tendency to return to its natural site, and the results have been rather disastrous. The author's method of transplantation of the rectus muscle, when the conjoined tendon is too poorly developed to guard the lower portion of the opening, seems to be an excellent one so far as one can judge by the results at hand. He claims essential points of difference from Wolfler's method. There are some grounds for doubting the superiority of the incision in the groin for varicocele, which is recommended in place of the usual scrotal incision; the prospect of speedy primary union is tempting, but epididymitis and hydrocele seem to have been of frequent occurrence. A large portion of the volume is devoted to abstracts of the histories of all the cases. Handsome cuts, showing the stages of the typical operation, the method of transplantation of the rectus muscle, and the use of rubber gloves are included; also photographs of hernias before and after operation, of unusual size, etc. The thanks of the profession are due the author for his laborious efforts and scientific enthusiasm in compiling this important contribution to the literature, which will be of lasting value to all future investigators on this subject. J. H. J.

LEA'S SERIES OF POCKET TEXT-BOOKS. PRACTICE OF MEDICINE. A MANUAL FOR STUDENTS AND PRACTITIONERS. By GEORGE E. MALSBARY, M.D., Assistant to the Chair of Practice, Medical College of Ohio, University of Cincinnati, etc. Illustrated with 45 engravings. Philadelphia and New York: Lea Brothers & Co.

THE plan of this work is indicated by the fact that it includes within 388 pages a discussion of the subject of practice of medicine; but the purpose for which it is intended is admirably filled. It is written with great conciseness and yet clearly, and the main points of diseases are well brought out. There is enough attention given to etiology to give the student some conception of this portion of the subject, a praiseworthy feature which many manuals do not share with this one; and the etiological facts as given here, especially those relating to the infectious diseases, are well up to date. A manual becomes a dangerous thing if the student, or, more especially, the young practitioner uses it as his sole guide, as, unfortunately, so many do. When used to give a framework to which facts derived from broader collateral reading may be fixed, these small works have a valuable place, and this manual deserves decided commendation for such use. D. L. E.

PROGRESS
OF
MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,
PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

Chronic Hyperplastic Perihepatitis.—CURSCHMANN was the first to differentiate this condition as a special disease, though as early as 1864 Bamberger described two cases of ascites which he attributed to a compression of the liver by a thick fibrous covering. A number of cases of this disease have been reported, among them the following interesting one by SCHMALTZ and WEBBER. The patient was a woman, aged forty-two years, and without a history of syphilis. The disease began in 1892 with enlargement of the abdomen, following a cold. At that time the patient was very anæmic, and had severe nose-bleed. In January, 1893, ascites was present, the legs were œdematous, and the liver markedly enlarged and sensitive, reaching within a hand-breadth of the pubes. The heart was enlarged, and a systolic murmur was audible over the entire præcordium. Considerable improvement followed the administration of potassium iodide. In January, 1894, the abdomen enlarged again, and the patient was tapped. Ten months passed before another operation was necessary, but after this the tappings were frequent and the amount of fluid removed large—as much as 13 litres. In the summer of 1895 the liver was hard and still large, the lower border being on a level with the navel. From November, 1895, the patient was confined to bed; death occurred in June, 1896. A definite diagnosis was not made during life. The great pain in the region of the liver at the beginning of the disease and its long duration—three and one-half years—suggested chronic perihepatitis. Post-mortem: The upper surface of the left lobe and parts of the right lobe of the liver were closely adherent to the diaphragm. The under surface of the liver was adherent to the peritoneum in front of the right kidney. There were short tendinous, thread-like growths between the under surface of the left lobe of the liver and contiguous parts of the stomach. The liver on its non-adherent upper surface was covered with a fibrous, white, glistening, porcelain-like coat, resembling frosting. In places the clear, brown liver tissue could be seen. Its borders were markedly rounded, producing a cylindrical shape. Its consistency was slightly increased. The fibrous covering varied in thickness from 5 to 6 mm., and enveloped and strongly compressed the liver. The liver substance was normal, especially free from proliferation of connective tissue, the hyperplasia confining itself essentially to its peritoneal covering. It is important to note that there was no pericardial adhesion and no other severe cardiac disease to account for the alterations in the liver, so the condition was very different from that described by F. Pick under the name of pericardial pseudocirrhosis of the liver. It therefore seems impossible that the perihepatitis could be due to the irritation of a chronic congestion. The authors point out that in the early histories of many of the cases, as also in the one now reported, there was a great enlargement of the liver. They believe that at this time some causes of inflammation arrived in the peritoneum which were ineffective on the major part of that membrane, but on the abnormally tense serosa of the liver were able to set up a chronic inflammation. As a cause of the supposititious invasion there was in the present case an old appendicitis, while as the cause of a temporary congestion of the liver cardiac weakness from repeated hemorrhages seemed certain from the early history. It is a very striking fact that in all cases of this kind hitherto reported the portal radicles do not show the usual changes as they occur, for example, in ordinary cirrhosis. For this reason and on account of the continued ascites the authors believe that some other cause than portal obstruction must be present. This they find in the alteration of a large part of the peritoneum, especially that covering the diaphragm, believing that this must cause more obstruction to absorption from the peritoneum than inflammation in other parts of the abdomen. The clinical course in the present case corresponds with those previously reported, in the fact that after a certain time the disease seemed to become stationary, so that after thirteen punctures it was not necessary to tap again for ten months. The total course of three and one-fourth to four years was shorter than in many other cases, perhaps owing to the previous anæmia and weakness of the patient. Important points in the diagnosis are the acute beginning of the disease, its slow course, and the absence of all severe signs of portal obstruction.—*Deutsche med. Wochenschrift*, 1899, No. 12.

Myoidema in Pulmonary Tuberculosis.—Walsham (*The Lancet*, January 27, 1900, p. 230) has made some observations on the occurrence of "myoidema" in 1000 cases of pulmonary tuberculosis. If a point on the chest wall corresponding with the clavicular origin of the pectoralis major be struck in a patient with advanced tuberculosis the phenomenon known as "myoidema" will probably be observed. Myoidema may be divided into two varieties, viz., the fascicular and the nodular. The fascicular is most easily produced. At the point which is struck a sulcus is formed which quickly travels to the origin and insertion of the muscle, where it is lost. In the nodular variety there is formed at the point struck a small, quivering tumor which, after oscillating backward and forward, as if uncertain of its position, for a second or two, finally comes to rest, and after a few seconds gradually fades away. If the point struck be watched, the initial pallor produced by the blow quickly gives way to redness, reminding one forcibly of tache cérébrale. Both these forms of myoidema may be obtained over other muscles besides the great pectoral.

The phenomenon is not a new one. It was first described by Dr. Stokes, of Dublin, in cases with pulmonary affections. The term "myoidema" was first made use of by a surgeon, the late Dr. Lawson Tait, who wrote a monograph on the subject in 1872. He believed the sign to be diagnostic of pulmonary tuberculosis. Dr. Samuel West had pointed out that the sign was not confined to cases of pulmonary tuberculosis, but showed that it also occurred in other wasting diseases. Jeanselme and Lermoyez claimed that the sign was a physiological phenomenon and could be obtained in healthy individuals. Walsham, however, states that he has never been able to obtain the phenomenon in healthy persons. Sir William Broadbent finds the sign almost always present in early phthisis, and Stokes claims that it is always most evident in the earlier periods.

With the object of settling some of these conflicting statements, Walsham observed 1000 cases of pulmonary tuberculosis, with special reference to this sign. He has never found it in an early case. It only becomes well marked when the wasting has advanced beyond a certain degree. The rule that the more marked the wasting the more marked is the myoidema has few exceptions. He could not confirm the statement made by some, that in unilateral phthisis the sign was confined to the affected side. In very advanced cases with great emaciation, Walsham has often failed to obtain the phenomenon, the pectoralis major apparently being too much wasted to produce it. He thinks that myoidema is nearly valueless as an early sign of pulmonary tuberculosis. It only becomes well marked when other physical signs leave no doubt about the diagnosis of pulmonary tuberculosis.

An Experimental Study in Gout.—FREUDWEILER (*Deutsches Archiv für klin. Med.*, Band lxiii. p. 266) has made an experimental study of gouty nodules, and finds that by the injection of sodium biurate a lesion can be produced which corresponds anatomically with that of true gout. The lesion does not appear to be the result of the action of a simple foreign body, but one due to the specific poisonous effect of the biurate. It is improbable that necrosis of tissue precedes the crystalline deposit, because the biurate alone is able to cause complete necrosis, and, on the other hand, crystals were found in tissues anatomically intact. The artificial biurate foci disappear in consequence of phagocytosis. The author finds no proof that the crystals are dissolved either physically or chemically, but does not deny such a possibility.

Observations Concerning Leukæmic Lesions of the Skin.—OERTEL (*The Journal of Experimental Medicine*, September-November, 1899, vol. iv. p. 369) has reported a case of leukæmia cutis, and draws attention to the rarity of the condition. The first case reported was that of Biesiadeckis, which was published in 1876. The cases of leukæmia of the skin which have been published up to the present may be divided into three classes:

The first class is represented by cases in which there are circumscribed, multiple, pin-head to hazelnut-sized, rapidly growing, pale or faintly red to brownish-colored tumors, irregularly distributed over the body, with little tendency to retrograde metamorphosis or ulceration.

The second class is characterized by a few solitary, brown, markedly elevated, lobulated, firm, slowly growing, and persistent nodules. According to Neuberger, the condition consists of a lymphoid-celled infiltration into the cutis, especially around the follicles, by which the deeper layers of the epidermis are compressed, although they are still separated from the infiltration in the lower part of the cutis by a small, narrow, non-infiltrated zone of connective tissue.

The third class includes those cases in which the lesions are more diffuse. They show, on the one hand, a diffuse, moist, eczematous appearance, especially of the head, extremities, and chest, and on the other hand, tumors the size of a pea to a pigeon's egg, which ulcerate spontaneously, leaving a large, flat, red ulcer. An eczematous condition of the skin is present.

The most definite statements yet recorded concerning the structure of leukæmic cutaneous nodules are to be found in Nékám's recent discussion of the subject. Without going into the histological details of the three above groups of cases, it is sufficient to say that Nékám is fully convinced that a number of the cases reported as examples of leukæmia cutis, and particularly the diffuse lesions falling under the third group, cannot be regarded as such, owing to the fact that neither the clinical nor the anatomical characters of leukæmia or of the tumors were indisputably established. He accepts as undoubted examples only the cases of Biesiadeckis, Hochsinger and Schiff, Neuberger, and his own, in all of which there were definite nodules the size of a pea to a hazelnut without a diffuse appearance.

After describing the histological features of the leukæmic nodules in the skin, Nékám states that they must be regarded as infiltrations, and we can, therefore, accept as such only those which fulfil the following conditions:

1. They must occur during the course of true leukæmia.
2. Their origin must be exclusively a diapedesis of cells from the blood, local proliferation of cells being absent.
3. A part of the cells, especially the red corpuscles, are returned to the blood by way of the lymph-channels, another part, especially the leucocytes, are carried off through the epidermis, or otherwise discharged.
4. The chief bulk of the cells composing the nodules undergo no metamorphosis.

The case which Oertel reports was a man, aged about forty years, who had been ill for two years. The attending physician had at first treated him for malaria, owing to the markedly enlarged spleen. Some time before the patient's death, according to the physician's statement, " there appeared on the skin small nodules, irregularly distributed over the body." They appear to have been observed first on the chest and arms, then on other parts of the body. Their appearance at once led to a diagnosis of multiple sarcoma of the skin. It was after this that Oertel first saw the patient. A blood examination was ordered, and a slide sent him for examination showed an enormous increase in the white corpuscles, with numerous myelocytes and eosinophiles. There remained no doubt but that the patient was suffering from leukæmia. The case was not heard of again until weeks later, when Oertel was requested to make an autopsy. Only a partial autopsy was permitted, but he was able to obtain the spleen, a small piece of the liver, and two of the cutaneous nodules from the left thigh.

The sections of the nodules removed were stained in hæmatoxylin and eosin, the Biondi-Heidenhain mixture, and in Unna's methylene-blue. The epidermis and upper part of the cutis showed no definite changes. The lower part of the cutis, on the other hand, was the seat of a dense and diffuse so-called small-celled infiltration. The largest part of the infiltration was made up of cells presenting the characters of lymphocytes. These were of two kinds: (1) Small cells with narrow, faintly staining cytoplasm and deeply staining nucleus, and (2) larger cells with feebly staining cytoplasm and a large, sometimes indented, somewhat irregularly staining nucleus. There were found also (3) polymorphonuclear leucocytes and (4) eosinophilic leucocytes. Apparently no myelocytes were found. There were but few red blood-corpuscles and only an occasional plasma cell was found. No mitoses were observed, and in this regard Oertel's observations agree with Nékám's. Oertel states that his study of the nodules in this case goes to support the view of those who regard secondary leukæmic nodules as essentially composed of cells derived from the blood rather than from the local proliferation of cells.

A Contribution to the Study of Alcaptonuria.—A. E. GARROD (*Medico-chirurgical Transactions*, 1899, vol. lxxxii. p. 367) reports five new cases of alcaptonuria and gives a tabulated list of all the cases hitherto reported, making a total of thirty-one cases in all.

The urinary condition known as alcaptonuria was first described in 1859 by Bodeker, who suggested the name. The following are the essential features of the urine in alcaptonuria:

1. Although of normal appearance when passed, the urine rapidly acquires a deep brown color, and ultimately becomes black on exposure to air.
2. The brown color is greatly intensified by alkalines, its development being accompanied by oxygen.
3. The urine reduces Fehling's solution with the aid of heat, and actively reduces ammoniacal silver nitrate solution in the cold.
4. The bismuth test for sugar yields negative results (one recorded case alone offered an exception to this rule).
5. The urine has neither dextro-rotatory nor levo-rotatory power.
6. The fermentation test yields negative results.
7. Fabrics moistened with the urine become deeply stained on exposure to air.

From the thirty-one recorded cases alcaptonuria appears to be much commoner in males than females. There were twenty-three of the former and only eight of the latter. In the great majority of cases the anomaly dates from childhood. In seventeen of the cases it had been observed since infancy. Several members of a family may be affected. Kirk reported three cases in one family; all were brothers. Baumann and Wolkow have pointed out that lifelong alcaptonuria is apparently without any injurious effect upon the health of its subjects. The alcaptonuria may be intermittent.

The peculiar reactions in alcaptonuria have been attributed to various substances—pyrocatechin, uroleucinic acid, glycosuric acid, and homogentisinic acid. It is now generally conceded that homogentisinic acid is the cause of alcaptonuria in the vast majority if not in all cases. It was first isolated in 1891 from an alcapton urine by Wolkow and Baumann, and has the formula $C_8H_8O_4$.

Tyrosin is the parent substance from which the homogentisinic acid is formed. Wolkow and Baumann thought that alcaptonuria was due to a disturbance of the metabolism of tyrosin due to the presence of a special intestinal bacterium. Some opposition has been advanced against this view, however.

In four of his five cases Garrod isolated the lead salt of homogentisinic acid.

The Diagnosis of Typhoid Fever.—NAEGELI (*Correspondenz-Blatt für schweizer Aerzte*, 1899, No. 18) made use of an epidemic of typhoid fever in an almshouse to investigate the results of the serum diagnosis and blood examination. Some of his investigations are worthy of wider control. After considerable investigation the source of the epidemic was found in the dairyman of the institution, who, several weeks before the beginning of the epidemic, had an indisposition with diarrhœa, sweating toward evening, and disturbing dreams, but who did not consult a physician. Four months afterward he gave an intense Widal reaction, a dilution of 1 to 100 causing agglutination in fifteen minutes. In answer to a possible objection that the man could not have infected the inmates through the milk, because the milk would have been boiled, the author points out that in pouring milk from vessels for boiling small quantities are frequently left behind which are afterward mixed with the boiled milk and then consumed. In addition to this there are, of course, other possibilities. The author gives the results of his investigations in the leucocytes in typhoid fever, of which the following are worthy of consideration: He finds that the neutrophile cells decrease rapidly in the first stage of typhoid fever, soon reach the half of their usual number, and gradually further decrease up to the stage of defervescence. In the convalescence they begin to increase, at first slowly, and then rapidly. It is usually only after many weeks that the normal figures are regained. Before the onset of the fever there is probably a neutrophile leucocytosis. The author was not able to make blood counts in this stage, but found such an increase in the beginning of relapses. After this the relapse showed conditions similar to those described for the primary attack. Complications, such as parotitis, cystitis, otitis, suppurations and eruptions, often cause an increase of the neutrophiles before other clinical phenomena are manifest. The lymphocytes are much reduced in the first and second stages, increased at the end of the second or beginning of the third stage, soon pass the normal number, and reach the maximum long after the subsidence of the fever. The eosinophile cells decrease at once in the beginning of typhoid fever, and usually are completely absent in the first and second stages. Long before the defervescence, on the average a week before, the eosinophile cells reappear as a sign of good prognosis, and gradually increase, reaching the normal in the third week after defervescence. Sometimes, especially in children, they long remain above normal. Relapses have the same effect as the primary attack, but complications, if not severe, usually do not influence the lymphocytes at all, and the eosinophiles very little. In children with typhoid fever the decrease of the total leucocytes is not so great as in adults, and does not last so long. The differential count is therefore important. By means of the leucocyte count and the serum test the author was able to recognize eight cases that would otherwise have been overlooked, including three in which there were no symptoms at all. From his own investigations he is inclined to consider the leucocyte count as at least equal in value to the serum test or in some cases even permitting a diagnosis where the serum test is negative.

A Contribution to the Subjects of Chronic Interstitial Nephritis and Arteritis in the Young, and Family Nephritis.—BRILL and LIBMAN (*The Journal of Experimental Medicine*, September and November, 1899) report an interesting case of chronic interstitial nephritis in a young girl, aged fourteen years, and draw attention to the fact that chronic nephritis, especially the interstitial type, is commoner in children than is generally supposed by the medical profession.

Of 251 cases of chronic nephritis observed by Heubner in Leipsic, 214 occurred in adults and 37 in children. He subsequently saw 28 cases in children in Berlin, mostly after scarlet fever. Of these 65 cases there were 3 of parenchymatous nephritis, 4 of contracted kidney, and 5 of chronic hemorrhagic nephritis. Bartelo has observed chronic interstitial nephritis in one case at the age of eighteen, in another at nineteen, and in two at twenty.

Heubner states that there are only thirty cases of interstitial nephritis in children on record in which post-mortem examinations have been made. He adds to his list four cases from his own experience; three are males, aged respectively fourteen, nine, and twenty-four, and one in a female aged eleven. According to Heubner, there are seven cases in the literature in which there is no history of a previous acute attack, so that they can be looked upon as instances of primarily contracted kidneys. The ages of five of these cases at death were five, six, ten, thirteen, and fourteen years respectively. Heubner had one case which belonged in this class, in a boy, aged nine years, who presented typical symptoms of chronic interstitial nephritis. Baginsky and Weigert have reported cases in which the interstitial nephritis was congenital.

Brill and Libman report a fatal case of chronic interstitial nephritis, with the pathological findings in a girl, aged fourteen years. The kidneys in this case were among the smallest that have been recorded in the chronic nephritis of early life. The right weighed 59 grammes and measured 9 x 4 x 3 cm. The left weighed 34½ grammes and measured 6¼ x 3½ x 2½ cm. On microscopical examination both kidneys showed the characteristic changes of advanced chronic interstitial nephritis. The heart showed marked hypertrophy of the left ventricle. An interesting feature in this case was the extensive calcareous degeneration of the branches of the hepatic artery. This degeneration began apparently in the intima of the arteries, and later spread to involve the areas supplied by them. The deposit was found to be calcium phosphate. A similar degeneration was found in some of the arteries in the kidneys. Large hemorrhages were found in the spleen and mesentery, and these had been suspected *intra vitam.*

In the absence of the usual etiological factors in this case, Brill and Libman thought that it might possibly be a case of so-called "family nephritis." Several observers have reported instances in which a number of the members of a family have suffered from nephritis. An inquiry into the patient's family history revealed that there was a "tendency" to the development of chronic interstitial nephritis in the three eldest children.

Brill and Libman summarize the main facts in this case as follows:

1. The occurrence of a very advanced primary chronic interstitial nephritis at the age of fourteen years.
2. Its presence in other members of the same family.
3. The extensive and marked arterial changes present.
4. The hemorrhagic diathesis and especially the occurrence of a large hemorrhage in the mesentery.
5. The occurrence of calcific deposits in the liver.
6. The case draws our attention again to the latency of some of these cases of chronic nephritis in children. There is no doubt that some of them have been regarded as instances of diabetes insipidus. The necessity of a careful and continued observation of the heart and vessels in such cases is apparent. Others are treated for a long time for anæmia without its cause being discovered. Still others do not present themselves for treatment until the fatal termination is close at hand, the patients having had no marked symptoms. The fact that chronic nephritis may run so latent a course and may occur at any age should lead us to pay as much attention to the examination of the urine of children as of adults.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL;

ASSISTED BY

ALFRED C. WOOD, M.D., AND C. L. LEONARD, M.D.,

INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

A New Method of Treating General Peritonitis with Drainage in Cases of Diffuse Peritonitis.—Bode (*Cent. für Chir*, January 13, 1900) reports a new and thorough method of treating cases of diffuse peritonitis. He employs large quantities of normal sterile salt solution. The intestines are delivered *en masse*, and while they are covered with sterile towels soaked in hot sterile salt solution, the abdominal cavity is thoroughly scrubbed and flushed. The intestines are then all carefully washed and any wounds sutured. When they are replaced, a drainage-tube having perforations in the middle is introduced, and the ends carried over the colon on either side and out through openings in both lumbar regions. Through these openings drainage-tubes are carried into the pelvis or any other portion of the abdomen that has been the seat of a focus of suppuration. Drainage is also inserted through the laparotomy wound as in ordinary methods. A peculiarity of the after-treatment is that the cavity is flushed out through these drainage-tubes in the daily dressings by means of large amounts of normal salt solution. When the symptoms of peritonitis subside, usually after three or four days, the tubes are withdrawn gradually and the wounds allowed to heal. The success of the treatment has been very marked, patients with very grave symptoms having recovered rapidly.

Local Anæsthesia in the Radical Cure of Hernia.—Cushing (*Annals of Surgery*, January, 1900) reports that 233 herniotomies have been performed in Professor Halsted's clinic in the past two years, and that of these forty-nine were performed under regionary anæsthesia.

Almost all cases of hernia, with the possible exception of those in young children, could undoubtedly be subjected to the radical operation under similar local methods, but when a general anæsthetic can be safely administered, for various reasons it is much to be preferred by both patient and operator.

In the cases reported complete narcosis was contraindicated by advanced age, chronic bronchitis, and emphysema, tuberculosis, laryngeal or pulmonary, cardivascular changes of marked degree, chronic nephritis, and above all the shock and vomiting in strangulation. Besides these there have been about 200 cocaine operations of major character, where the use of a general anæsthetic was avoided for a similar reason. They included thirty laparotomies, exploratory sections ; two gastrostomies ; closure of a traumatic rupture of the jejunum ; three cholecystotomies for empyema of the gall-bladder ; three appendectomies, and one operation for the closure of a typhoid perforation. In handling the gut it was found that an anæsthetic was required, and no pain was produced unless traction was made excessive.

Local anæsthesia is particularly suitable for the ligation of varicose veins, suprapubic cystotomies, and all scrotal operations if done through the high incision.

The author gives a brief résumé of the case operated upon, and details the condition present and the result produced by the operation in some of the more important cases. In cases of strangulation, where the vomiting and shock from the absorbed toxins is great, the use of a general anæsthetic is contraindicated. He says : "It is in border-line cases of this sort that local anæsthesia gives the best chance of recovery. In just such cases do we often meet with death under or rapidly following the general anæsthetic."

He has carefully studied out the source and distribution of the cutaneous nerve supply of the operative area, both in dissections on the cadaver and by observations of the region of the cutaneous anæsthesia which results from such operations. Such knowledge is essential to the proper employment of the local anæsthetic in these or any operation.

Although not entering into the discussion of the merits of different local anæsthetic mixtures, he is well satisfied with Schleich's 1 : 1000 cocaine muriate mixture for infiltration anæsthesia. He has not found that the solutions of eucaine-B, suggested by Braun, have any advantage, while the duration of the eucaine anæsthesia is not quite as great. For anæsthetizing the individual nerve-trunks he employs a ½ to 1 per cent. sterilized solution of eucaine-B or cocaine, which is injected directly into the nerve.

The patients are prepared for operation by accustoming them to confinement in bed and getting them used to evacuating the bowels and passing the urine without getting up. A tenth or eighth grain of morphine is injected three-quarters of an hour before the operation, and repeated just before it is commenced. Its disadvantage is the confining of the bowels. The patients are often shaved and prepared on the table. The skin is infiltrated in the line of the incision. The tissue is found to be very vascular, and all bleeding is stopped, as it is essential to the dissection. It is unnecessary to anæsthetize the panniculus. Nerve fibres may be encountered in it, and veins that will cause pain if resected. The wound should be deepened to the aponeurosis at the upper angle near the external ring. The aponeurosis is then opened in the line of the fibres from the external ring, and the ilio-hypogastric and inguinal nerves immediately cocainized with a 1 per cent. solution. This produces anæsthesia of the whole lower operative field if the high incision is employed and the scrotum not opened. The ilio-inguinal and genital branches should be carefully displaced in the lower angle of the wound. The closure of the wound does not require any further anæsthesia. If the subcuticular silver suture is employed the skin edges will still be sufficiently anæsthetic to permit of its introduction. Sometimes a few inhalations of chloroform, not enough to produce unconsciousness, are necessary if the patient becomes very nervous or a sensory nerve fibre is cut. No post-cocainization pain has been complained of, while the infiltration has not interfered with primary union under one dressing generally in ten days.

The Surgical Aspects of the Modern Small-bore Projectile.—SCHACHUER (*Annals of Surgery*, January, 1900) derives the following conclusions from his study of this subject:

1. All advanced nations have practically the same character of rifle and projectile, and the remarks applying to one apply practically with equal force to all.

2. That the modern small-bore projectile is capable of producing wounds of both a humane and a gruesome nature.

3. The nature of the wound produced by the small-bore projectile is either dependent upon the intervening distance or the character of the structure wounded, or both.

4. The precise manner in which the explosive action is developed in structures filled with or rich in fluid is still *sub judice.*

5. The weight of evidence and the majority of authors favor the hydrodynamic rather than the hydraulic theory.

6. The new projectile is propelled with greater energy, velocity, and accuracy; it is lighter, has a smaller frontage, and is less liable to deformation on striking an object.

7. The new projectile has less "disabling capacity," and on the whole produces wounds of a more humane character than the old leaden bullets.

8. By explosive action is meant the damage created in structures outside of the projectile's path.

9. The explosive action depends upon the deformation of the projectile, the range, and the character of the tissue.

10. The shorter the range within the first 400 to 600 yards of the projectile's flight the more pronounced the explosive action.

11. At 800 or 1000 yards explosive action is occasionally met with, and then only in the skull or in parts of the body filled with and rich in moisture.

12. At a distance of 800 or 1200 yards the new projectile, as a rule, creates wounds with small orifices of entrance and exit, and little or no explosive action.

13. That the rotatory action of the projectile may continue after its penetrative movement ceases, and that the character of the wound is partially dependent upon this rotation.

Inflammation of the Costal Cartilage as a Sequela of Typhoid Fever.—LAMPE (*Deut. Zeit. für Chir.*, Band liii., Heft 5 and 6) concludes from his study of the clinical features and pathology of this condition that:

1. The inflammation of the cartilage originates in the cartilage itself. The perichondritis is secondary, although its clinical symptoms are the first to appear.

2. There are certain alterations in the cartilage which must proceed before infection can take place. They are due to age, and consist in vascularizations and the formation of sinuses or narrow cavities.

3. The treatment depends on the degree of inflammation; without suppuration an expectant treatment may be employed, but so soon as suppuration manifests itself the only treatment is operative. The excision of the entire costal cartilage is the only guarantee of cure.

Laceration of the Intestine with Rupture of the Mesenteric Artery Without a Skin Wound.—SHEPHERD (*Montreal Medical Journal*, July, 1899) reports a very rare case in which a traumatism produced a complete rupture of the small intestine without any external wound. The rectus abdominis muscle was, however, ruptured, the mesentery torn across, and with it the superior mesenteric artery near its origin. The patient's condition was very critical when he came to the hospital, and rapidly became worse. The operation was performed an hour after his admission. The abdomen was found filled with blood and intestinal contents, and, although the artery was secured and little blood was lost after the operation was commenced, the patient sank and died shortly afterward, although normal salt solutions were employed hypodermatically and the abdomen was filled with normal salt solution. Stimulant treatment was also employed. If the patient had recovered there would undoubtedly have been gangrene of a large part of the gut, and consequent death.

Internal or Direct Herniæ in the Female.—ESCHER (*Deut. Zeit. für Chir.*, 1899, Band liii., Heft 5 and 6) comments upon the rarity of these herniæ as reported in literature or described by systemic writers. In 600 cases of inguinal herniæ which he has operated upon for the radical cure by Bassini's method there were forty-nine cases inguinal hernia in the female. Five of these cases were direct or internal herniæ. Of the 551 cases of herniæ in the male thirty-five were of the internal variety.

Of the five cases in the female, two were not examined to determine which variety of internal hernia they represented. In two of the cases the hernia originated in the fovea media and fovea interna, respectively, while a third was through the fovea interna.

The author believes that the difficulties that arise from the varying nomenclature of the herniæ could be avoided by designating them by the fovea on the peritoneal aspect, through which they make their exit. Thus the external oblique inguinal hernia would be termed hernia foveæ inguinalis externæ; the hernia inguinalis directa would be the hernia inguinalis foveæ mediæ, and the hernia inguinalis obliqua would be the hernia inguinalis foveæ internæ.

The Radical Cure of Inguinal Hernia in Infants.—FRAENKEL (*Cent. für Chir.*, November 25, 1899) holds that the indications for the radical operation are as strong in children, even nurslings, as they are in the adult. Recent research and clinical experience have shown that a great many of the herniæ seen in adult life are the result of the non-obliteration of the vaginal process of peritoneum—that is, the sac is already there, and the opening, which was closed by only slight adhesions, yields under sufficient stress. This is also the tendency of herniæ which have been cured by truss or pad in early life. In addition to the danger of recurrence there is the physical and psychic influence which the presence of such a disability always has upon the development of mind and body of the individual. The danger accompanying such an operation is no greater than in other operations of like character. Asepsis can be secured by appropriate dressings, fixing the limb on the side of operation and the employment of occlusive dressings about the rectum and penis. The results of the operations have been very satisfactory. Primary union was secured in the majority of cases in from eight to ten days. The effect on the digestive tract has been a marked improvement and an increase, as the result of operation is not to be feared, although any irregularity should be corrected as nearly as possible before the operation is undertaken.

The Radical Treatment of Umbilical Hernia.—PICCOLI (*Cent. für Chir.*, 1900, No. 2) calls attention to a new simple method of radical operation for this form of hernia, which is in a measure similar to the Bassini operation for inguinal hernia. It is based on the principle of replacing the linea alba by two overlapping layers of the muscular wall, thus transforming a linear scar having an antero-posterior direction, which is in the line of pressure, into a transverse, broad scar between the two overlapping surfaces, which is also a transverse plane to the line of pressure. This is the same principle as that evolved by MacEwen in his radical cure of inguinal hernia and amplified by Bassini in his latest modification of his radical operation.

In applying it to umbilical herniæ the author proceeds as follows: The incision extends two or three inches above and below the hernia, according to its size. The hernia is reduced, the sac fastened with a Billroth clamp, resected, and the resulting wound closed by sutures. The peritoneum is carefully dissected up by the finger passed through the hernial opening as far as possible with the finger. The abdominal wall is then cut in the linea alba above and below, with the finger used as a director. The hernial opening is thus converted into an ellipsoid. Four or five sutures are now placed in the edge of the wound through the muscle and sheath of the rectus. They are knotted and the ends left long. These ends are carried separately beneath the muscle on the opposite side and penetrate it at a point about an inch from its free margin. The two ends come up through the muscle and its sheath at separate points. Strong traction is made upon them, thus forcing the edge of one rectus beneath the other. When all the sutures have been passed, tightened, and knotted in this manner an ellipsoidal overlapping of the two recti has been secured at the point of the hernial opening. The free edge of the rectus that has been penetrated by the sutures is now drawn over and secured by interrupted sutures to the sheath of the other muscle. The superficial fascia and skin are then united, completing the operation.

The author's clinical experience with this operation fully substantiates the result obtained in animal experimentation.

The Radical Operation in Crural Herniæ.—BRENNER (*Cent. fur Chir.*, November 4, 1899) calls attention to the fact that Salzer was the first to propose the closure of the crural ring by utilizing a crescentic flap formed from the pectineal fascia covering to the origin of the pectineus muscle. The flap is cut with its base attached to the os pubis, and is then turned over and sewed to Poupart's ligament. It is brought as close as possible to the internal border of the femoral vein.

The method of performing the operation is similar to that of other methods in isolating the sac, reducing the hernia and clearing the canal of all cellular tissue and glands. The sac is ligated, cut, and cauterized, when it generally retracts above Poupart's ligament. The pectineal fascia is seen glistening in the bottom of the wound after the removal of the tissue and glands. The flap is cut crescentic in shape. It has its convexity downward, which forms its free and inner border. Its base is thicker and attached to the os pubis. It is turned upward, so that the smooth surface covers the crural opening and attached by sutures to the middle portion of Poupart's ligament. A branch of the femoral artery and vein will often be found in the lower angle of the wound. No injury seems to be done by its section. It is not always essential to clear away the glands and connective tissue, and where possible they may be left. Sixty-three cases are reported with 91.8 per cent. of cures.

The Wisdom of Surgical Interference in Hæmatemesis and Melæna from Gastric and Duodenal Ulcer.—ARMSTRONG (*British Medical Journal*, October 21, 1899) reports two cases, one successful, one in which he operated, and one in which he assisted in the consultation, but in which he believed the patient was left too long before the operation was undertaken. This latter case leads him to the conclusion that operative interference is often too long delayed. The results of the pathological and clinical study of the subject he expresses as his opinion that the following are suitable cases for intervention. He first, however, makes the following clinical division into classes: "Those in which occur frequently repeated small hemorrhages, and those in which the loss of blood is in large quantities; and it would seem that each class has a distinct pathological lesion, and this should be borne in mind in the consideration of the treatment of hæmatemesis, medically or surgically."

If, then, we can exclude aneurism, which should generally be possible, and leukæmia or cirrhosis or other cause of portal obstruction, he holds that the surgeon should interfere in those cases, first, of frequently repeated small hemorrhages which persist in spite of medical and dietetic treatment, and which threaten to destroy the life of the patient; and, secondly, in all cases of hemorrhage which, in spite of medical and dietetic treatment, recur. In these cases he advocates operation after the second hemorrhage. For hemorrhage occurring in cirrhosis and portal obstruction he does not think that the surgeon can accomplish any good. In these cases the hemorrhage is generally from a varicose œsophageal vein, a part difficult of access and secondary to a pathological lesion but little amenable to any form of treatment.

In cases of gastric and duodenal ulcer, however, the conditions are totally different. The lesion is primary and local, and in addition to securing the bleeding-point a more smooth and rapid convalescence is secured, the likelihood of perforation removed, and if found advisable the performance of a gastro-enterostomy or pyloroplasty secures to the stomach the rest which favors the healing of the ulcer and insures against subsequent occurrence of narrowing and obstruction at the pylorus.

The Radical Operation of Inguinal Hernia in Children.—KAREWSKI (*Cent. für Chir.*, 1899, No. 51), in discussing the subject, disagrees with Fraenkel, who holds that the Bassini operation is essential to the cure of the cases and that it is indicated in all cases. He does not believe that we have proof that all herniæ that have been cured by the truss are liable to be reproduced in later life, or that all herniæ are capable of being cured by the truss. He believes that many herniæ are cured by the wearing of a properly fitting truss, and that there are, on the other hand, many cases where the truss is not efficient and where the radical operation is indicated at an early age. The indications are the persistence of the hernia in spite of the truss; that it is not held up or the truss is not well borne where the hernia is irreducible or incarcerated. These are indications for operation in the nursling or in very young children. In older children the healing is less liable to occur from the application of a truss, and operation is therefore more frequently indicated.

The radical operation is not to be considered a perfectly harmless and dangerless operation, and should not be undertaken for the same reasons one would operate on a hare-lip. The simpler the operation the better. The author has found that the forcing of the sac by blunt dissection, its ligation and resection are sufficient to produce a radical cure, and that more complicated operations are not indicated.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,

OF PHILADELPHIA,

AND

THOMPSON S. WESTCOTT, M.D.,

OF PHILADELPHIA.

The Elimination of Mercury by the Mammary Gland.—E. SOMMA (*La Pediatria*, 1899, No. 6) has made careful analysis of the milk of seven women who were being treated either by inunction of mercurial ointment or with subcutaneous injections of a mercurial. The most delicate reagents were employed, but in none of the cases was the slightest trace of mercury found in the milk.

The author therefore concludes that the treatment of heredo-syphilitics by the milk of women submitted to mercurial inunctions or injections of mercury has no rational foundation in fact.

The Subcutaneous Injection of Salt Solution in Acute Diseases.—LENHARTZ (*Société Médicale de Hambourg*, in *Annales de Médecine et Chirurgie Infantiles*, September 1, 1899, p. 674) reports his observations on the use of subcutaneous injections of a physiological saline solution in the treatment of numerous acute diseases in childhood. The immediate effect of such injections is to raise blood pressure, and consequently to increase diuresis. Not only is the force of the heart improved, but, to use an expression of Sahli, there results a lavage of the whole organism, which is thus relieved of toxins. This treatment has given excellent results in typhoid fever, pneumonia, grave dysentery, peritonitis, ileus, cholera infantum, and summer diarrhœa. In certain cases all alimentation by the mouth or by the rectum was suspended, and for several days the patients were sustained entirely by the injections, which were given in quantities of a litre for adults or from 400 to 600 grammes for children.

In typhoid fever, notably, it was observed that the injection exercised not only a tonic action, but also was calmative, quieting both physical and mental agitation. A case of dysentery which had eighty to one hundred stools a day, losing from 1300 to 7500 c.c. of sanguinolent mucus, was cured by systematic injections of saline solution in dose of two litres a day. These results were due to the rapid elimination of toxins. The treatment is especially recommended in cases of grave peritonitis in which it is impossible to operate at once.

Among the unpleasant sequelæ of this procedure are subcutaneous abscesses, which are observed rarely in hospital and slightly more frequently in private practice, and acute dilatation of the right heart in nurslings. In three autopsies of infants Lenhartz observed slight œdema of the glottis, of which there had been no symptoms during life.

The number of blood-corpuscles and the proportion of hæmoglobin fail to show any notable increase in the volume of the blood. The excretion of the sodium chloride is quite rapid and the relatively high gravity of the urine at first shows that a large quantity of waste products is eliminated. The density of the urine later is reduced.

A Second Attack of Measles a Month after the First.—GAUCHER (*Société Médicale des Hôpitaux*, in *Annales de Médecine et Chirurgie Infantiles*, December 15, 1899, p. 913) observed a boy, aged ten years, attacked with measles on June 2, 1899, from which he had completely recovered by the 15th of the month. His mother, who had had measles during childhood, contracted the disease from him and showed the first signs of eruption on the 17th of June. On July 5th the boy again became ill, showed the characteristic prodromes, and had a more copious eruption than during the first attack.

Suffocative Laryngitis at the Beginning of Measles.—SEVESTRE and BONNUS (*Archives de Médecine des Enfants*, 1899, No. 2, p. 65) call attention to the fact that congestion of the laryngeal mucous membrane, while a natural and usually insignificant phase of the disease, may at times give rise to the gravest accidents. These serious symptoms, which occur at the beginning of the disease and even before the appearance of the rash, assume the form of laryngismus stridulus, or of a paroxysmal dyspnœa with persistent suprasternal retraction during the intervals. Three cases were observed in which the condition became so grave that intubation was demanded. Examination of the secretions of the throat showed the absence of Klebs-Löffler bacilli.

Pathology of Measles.—STEFFENS (*Deutsches Archiv f. klinische Medicin*, 1899, vol. lxii.) has made a clinical study of 322 patients coming under the care of Professor Jurgenssen in Tübingen, with reference to the following points: 1. The existence of an immunity to measles in young infants. 2. The state of the temperature during incubation and the prodromic stage. 3. The complications and sequelæ of the disease.

For the first category forty-one nurslings were observed, all less than three years old. Of these sixteen contracted the disease and twenty-five escaped; and of the latter none had reached the age of five months.

In the second inquiry the author obtained the temperature-curves of fifty-seven cases which subsequently developed measles. These could be divided into three groups. In the first, which embraced thirty-six cases, the temperature during incubation remained constantly normal, and the children in every respect seemed in good health. In the second group, which comprised eleven cases, the temperature was elevated slightly several times to 99.7° or 100.2°, the general condition remaining good. Finally, in the third group, which comprised ten cases, there were six in which the temperature rose to 102° to 104°. In the other four cases the elevation of temperature was evidently due to causes other than the incubation of measles. Whence the conclusion that in the majority of cases the period of incubation is without any symptoms either in elevation of temperature or in the general condition.

Of seventy-one children whose temperature was taken accurately during the prodromal stage, only two had a normal temperature the evening before the eruption appeared. With the others there were elevations of temperature, which in the majority of cases followed one of two types: either the temperature mounted quite high the first day, to descend to normal the following days, and rise again the evening before eruption; or the temperature mounted slowly and remained elevated. The duration of the prodromal stage in sixty-nine cases was from three to four and one-half days. Of the complications, bronchopneumonia occurred in 26 and otitis media in 4 of the 322 cases. In three instances other acute infections occurred (varicella, scarlatina, and acute pemphigus), and croupous pneumonia in five. Of the total number 10 died, 8 of capillary bronchitis, 1 of acute gastro-enteritis, and 1 of a general pneumococcic infection with pneumonia. The general mortality was therefore 3 per cent., while that of the bronchopneumonia cases was 30 per cent. It is noteworthy, however, that of the eight fatal cases of bronchopneumonia five children were rhachitic and one had pulmonary tuberculosis.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,
PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Drugs in Cardiac Insufficiency.—Dr. O. T. Osborne insists that it is useless to administer drugs by the stomach in acute cardiac insufficiency, for there is no absorption, even though vomiting is absent. Spontaneous "cure" may occur (1) if the patient has strong enough will-power to prevent nervous excitation. Mental irritation of the heart, with peripheral spasm of the bloodvessels, is avoided, and the heart again quiets down. (2) Exhaustion from respiratory effort, with cerebral hyperæmia, causes a dulling of mental-power and consequent removal of nervous excitation, thus the heart quiets down. Morphine, hypodermatically, is the best drug, but it may impair respiration, and death follows. Atropine should be added in small amount. Vaso-constriction requires nitroglycerin, not more than $\frac{1}{200}$ [?] of a grain, hypodermatically, or tablets on the tongue every fifteen minutes till frontal throbbing results. This, combined with a hot foot bath, will often obviate necessity for venesection. If following the primary acute insufficiency there is dilatation, œdema, and passive congestion, digitalis is indicated, the dose depending on the valvular lesion. In aortic lesions the pulse-rate should not be reduced below 80, and nitroglycerin is also given to diminish peripheral resistance. In mitral stenosis, slowing the heart to fifty or sixty beats is often of value. When digitalis is used (digitalin, $\frac{1}{100}$ to $\frac{1}{50}$ grain hypodermatically, being most active), and the heart greatly slowed, the patient must not rise from his prone position until profound effects have passed off. With a full dose this does not occur for twelve hours. Cardiac exhaustion requires strychnine. The dose should be large, and not repeated within two hours. Camphor is best given in solution in olive oil, both drugs to be given hypodermatically. In marked cardiac weakness alcohol is dangerous (?), for it secondarily paralyzes the vascular system, increasing cardiac depression. By mouth, it reflexly stimulates the heart. Hypodermatically it should be used only in small quantities (?).

Compensation is best effected in chronic insufficiency by rest in bed and digitalis. When this drug is contraindicated, about fifteen minims of the fluid extract of cactus may be substituted. Cactus is not a vaso-constrictor ; it prolongs the diastole, strengthening and steadying the heart. No nausea follows its use, nor does oliguria result. When the two drugs are combined less amounts of digitalis are required, and compensation lasts longer. Sparteine and caffeine are recommended for a change rather than for serious indications. Reduce or prohibit alcohol, tea and coffee. A weak heart without valvular lesion, if hemorrhage has occurred, is most benefited by saline infusion. Heat to the extremities and heart, with elevation of the feet and artificial respiration, are invaluable. Ammonia salts, strychnine, atropine and camphor are indicated. Digitalin also if the heart rallies and weakness recurs ; also electricity. Digitalin is contraindicated in the true heart failure occurring in disease if the pulse is slow ; champagne and black coffee are valuable. Chronic weak heart without valvular lesion requires strychnine, small doses of digitalis, and cactus. The irritable heart of chronic tobacco poisoning responds best to ample doses of strychnine or cactus, or small doses of digitalis.—*Medicine,* 1899, vol. v. p. 793.

Cinchonidine and Wrightia Antidysenterica; Prophylactics Against Dysentery and Malaria.—MR. R. S. ASHE, experimenting with large gangs of prisoners during several months, concluded that cinchonidine sulphate reduces the prevalence of fever (malarial ?), and that wrightia antidysenterica (inderjao) diminishes tendency to dysentery. He therefore placed the entire jail population on a prophylactic combination of cinchonidine sulphate and inderjao, of each five grains three times a week before the mid-day meal. Though intermittent fever still occurred, its severity was diminished, and the same applied to dysentery. Inderjao has no specific effect as a prophylactic for malarial fever, but its very great value in the prophylaxis of dysentery is certain.—*The Indian Medical Gazette,* 1899, vol. xxxiv. p. 313.

Quinine in Malaria.—DR. GEORGE DOCK objects to the expectant treatment of malaria, first, because of the destruction of erythrocytes, which, in even a mild attack, may be extensive. In a severe paroxysm more than one-fifth of all the blood-corpuscles in the body may be destroyed within two days, and, secondly, because there is no means of knowing whether a given attack will cease spontaneously or not. The severity of subsequent attacks is also an unknown quantity. Doses : Mild intermittent forms are checked by 5 or 10 grains given once. In general, 15 grains is the average. In severe æstivo-autumnal forms, 20 grains daily are required. To check growth, or kill the parasites, it is recommended to bring the greatest possible quantity of the remedy (quinine) consistent with safety in contact with the parasite. As a rule, where the paroxysms are distinct, the whole amount should be given at once, or within two hours. The two methods of administration, the one where the drug is given several hours before the expected paroxysm (Golgi), and the other where quinine is given during the decline of the paroxysm (Sydenham). The writer's own experience shows more certain and more satisfactory results following the latter method. The chill does not always occupy the same place in the temperature-curve, but occurs at any time from the beginning to the end of the rise; inaccuracy results if the chill be used as a guide for the time of indication. Directions based on the chill are especially faulty in the more severe fevers; often there is no chill. Golgi's method involves two risks: 1. A primary paroxysm may be diagnosed as due to tertian fever, and while waiting for the time for a first dose of quinine a second paroxysm (due to a double infection) may occur. 2. The last dose, ordered five hours before the expected paroxysm, is useless in case the parasites are gone. Absorption from the stomach is less certain just before the paroxysm. Conclusions are: In tertian or quartan intermittent, singly or in combination, quinine is to be given during the decline of the paroxysm. A single dose is preferable, or several at short intervals. The hydrochlorate is recommended, followed by fifteen drops of dilute hydrochloric acid. Few patients require more than three doses. For its tonic effect not more than two grains thrice daily should be taken. In the æstivo-autumnal type, five to ten grains, according to the severity of the case, at intervals of about five hours until the temperature remits, then the daily intermittent dose until apyrexia. Relapses usually occur on the seventh day or some multiple of it. Quinine should be given at seven-day intervals in tertian fever. Prophylaxis is best accomplished by giving eight to fifteen grains weekly for six weeks, then slowly lessen the dose and lengthen the interval. Hæmoglobinuria and hæmaturia may be due to past attacks of malaria, as well as to active infection. If there is no evidence of active malaria (blood examination) quinine is not to be used. Quinine is often more or less irritating to the urinary tract. Large doses may aggravate local kidney disease and cause or increase hæmaturia. Pending further knowledge quinine can be used cautiously if parasites are present, giving the drug in an absorbable form, in moderate doses, and withdrawing it as soon as microscopical examination of the blood shows it no longer necessary. A temporary increase of hæmoglobinuria is not alarming, and not necessarily due to the drug.—*The Journal of the American Medical Association*, 1899, vol. xxxiii. p. 248.

A Substitute for Poultices.—Mr. M. I. Wilbert recommends as an improvement on and a general substitute for poultices a mixture of kaolin and glycerin. The formula is as follows: Kaolin, 1000; glycerin, 1000; boric acid, 100; oil of peppermint, 1; oil of wintergreen, 1; oil of eucalyptus, 2. The kaolin is sifted and heated to 212° F. for an hour or more, to sterilize; the glycerin is added and heat continued for thirty to forty minutes, the mass being occasionally stirred. When nearly cool add the remaining ingredients and mix thoroughly. To prevent absorption of moisture it should be preserved in air-tight receptacles. It has the advantage of being readily applied without boiling or other preparation, and of not requiring renewal for from twelve to twenty-four hours, and of giving almost immediate relief from pain in most instances of acute or subacute inflammation or congestion. As a substitute for many ointments and cerates it has the advantage of not being greasy or dirty, and it can be readily washed off with cold water. It may be combined with such drugs as iodine, the various iodides, iodoform, tar and ichthyol.—*American Journal of Pharmacy*, 1899, No. 10, p. 478.

Tenalin.—DR. F. HOBDAY has investigated this substance, which is a mixture of the alkaloids found in areca nuts, to-wit: arecain, arecaidin, and guavin, separated so much as is possible from the remaining alkaloid arecolin. Ascarides are vomited or removed in the feces. Tæniæ are expelled entire. The dose is one grain for each pound of weight (animals), but may be doubled if necessary. It should be administered per os, dissolved in one-half to one ounce of water. It is ineffective when given subcutaneously.—*Klinische-therapeutische Wochenschrift*, 1899, No. 37, S. 1186.

Antiphthisic Serum, I. R. (Fisch), in Tuberculosis.—DR. A. M. HOLMES reports fifty patients treated during twenty-one months, and divides them in two groups: 1. Early stage; no expectoration; nineteen patients. In thirteen the tuberculin test was tried, and reaction followed. Without exception every patient made rapid improvement under the serum treatment. At the close of treatment they failed to respond to tuberculin. Only one relapsed after improving, nine months of good health intervening. Treatment was resumed (five months) with subsequently no reaction to tuberculin. Has remained well. 2. Thirty-one patients. Eleven were in incipient stage, with expectoration and bacilli. Four were cured, bacilli entirely disappearing; five distinctly improved, but the serum was discontinued too soon. Two continue to improve. The twenty remaining patients were in an advanced stage. Four improved markedly; seven slightly. These latter subsequently failed again. Three were unimproved, and six died. One death was due to pneumonia of the sound lung. Many were treated for a short time only. Best results followed extended treatment. Where tuberculosis is advanced the serum may temporarily check its advance, prolonging life to some extent. The effects of serum administration are: 1. If the process is well advanced a rise of temperature follows after about four hours; 104° F. may be reached, but the temperature remains high only for a short time. 2. Extensive use of the serum causes a marked infiltration of the areas used for injection. There is no accompanying tenderness or pain. The subcutaneous tissue is infiltrated and binds down the skin. 3. Prolonged use produces depression, best relieved by short intervals of rest. Treatment is to be resumed with small doses. 4. In time the lymphatic glands become tender and enlarged—sometimes within three days. Usually this occurs after one week. Stress is laid on the inherent recuperative power of some patients. Where this is lacking treatment is of no avail. The tuberculin test has two advantages: 1. It is a safe and positive means of diagnosis when bacilli are not discoverable. 2. It is a reliable method of estimating the degree of convalescence. The effect of the serum on the blood count is invariably to increase the young lymphocytes in convalescence (acting through stimulation of the lymphatic system [?]). Decrease is the rule in rapidly declining tuberculous patients.

Early diagnosis is insisted on, and the tuberculin test is recommended before treatment, diagnosis being doubtful, and the bacilli undiscovered.—*The Journal of the American Medical Association*, 1899, vol. xxxiii. p. 886.

Heated Blood in the Treatment of Croupous Pneumonia.—DR. C. E. ELFSTROM makes a third report of three patients thus treated. Diagnosis being established, a leech is applied (site not stated), and blood is drawn, diluted with salt solution, and heated to 140° F. during two hours; it is then subcutaneously injected. In a few hours all the symptoms improved, and recovery followed. In one instance, when the temperature began again to rise subsequently to a first injection; a second injection was given on the following day, and complete apyrexia rapidly followed. Of nine patients thus treated two have died; these had already developed signs of meningitis. If these be excluded, 100 is the percentage of cure.—*New York Medical Journal*, 1899, vol. lxx. p. 486.

The Treatment of Pertussis.—DR. G. J. KANHEIMER has obtained his more favorable results from the use of bromoform. Noting that the high specific gravity of the substance and the lack of settled practice among pharmacists in regard to dispensing by weight or measure, he prescribes it by drops. A fluidrachm contains four hundred and eighty drops; a drachm by weight one hundred and sixty drops. The dose is one drop for each year of age, given from three to five times a day, according to the severity of the disease and the effect produced. It is best given in syrup or mucilage of acacia or tragacanth, or with an emulsion of cod-liver oil, the latter being particularly adapted to debilitated children. The bottle should always be thoroughly shaken before administration of the dose.—*Pediatrics*, 1899, vol. viii. p. 431.

Antityphoid Serum in the Treatment of Enteric Fever.—DR. I. R. J. COWEN reports a patient thus treated in a relapse. In the original attack salol and bismuth salicylate were used. When the serum was injected the patient was in the "typhoid state" with marked peritonitis. Forty-five minims of serum were used. The next day a drachm and three-quarters of serum were injected. The abdominal symptoms were improving rapidly. Four epileptiform convulsions occurred, followed by aphasia. Convulsions were repeated daily, gradually diminishing. Difficult articulation and mental torpor continued. Attention is called to a rise of temperature in each case within three hours after the serum injection, and the remarkable action of the serum in improving the general condition, with increase in bodily strength. The difficulty in speech and convulsions was probably due to a cerebral embolus, and not to the serum administration. The result seems to indicate that antityphoid serum possesses properties of an antitoxic as well as bactericidal nature.—*The Lancet*, 1899, No. 3968, p. 778.

Treatment of Acute General Septic Peritonitis by Continuous Irrigation with Warm Normal Salt Solution.—DR. ERNEST LAPLACE concludes that this may prove to be a valuable aid in the treatment of heretofore fatal instances of peritonitis. To his knowledge it has not been used before the single instance reported. He concludes: 1. That the peritoneal cavity stands, with perfect safety, a continuous irrigation with normal salt-solution at a temperature of 100° F. during seventy-four hours. 2. The infection may entirely cease, together with pain, vomiting, and distention. 3. The irrigation was comfortable, and no complaints were made. 4. The copious irrigation, it is believed, dissolved and carried off the toxins as they were formed; it reached the more dependent portions of the peritoneal cavity, and removed infectious material; therefore, effectual drainage was established. It acted as a tonic to the heart; some was doubtless absorbed into the system. During three days the infection was held in abeyance by the antiseptic action of the salt, and phagocytosis had free scope to destroy permanently the infectious bacteria. The irrigation was carried out through an incision in the abdominal wall.—*Treatment,* 1899, vol. iii. p. 510.

A Grave Infection Treated by Artificial Serum.—DR. M. A. BALVAY reports that in a patient suffering from some severe general infection of unknown character, but somewhat resembling typhoid fever, cure was effected, where medication had signally failed, by the subcutaneous injection of a drachm and a quarter of sodium chloride and a drachm and three-quarters of sodium phosphate to about one quart of water. Within a week more than three quarts were injected. The treatment was not begun until after the fiftieth day of the disease. Following the first injection the patient was more comfortable and able to sleep soundly. No grave inflammatory reaction followed at the site of injection, though great feebleness of health had preceded the immediate disease. Effects of injection were: Subjective cold, frequent shivering for some hours, great diaphoresis and diuresis, diarrhœa and sialorrhœa. Cure apparently resulted from the very great stimulation of the various emunctories, notably the kidneys. A true "lavage" of the blood occurred.—*Lyon Mêdicale,* 1899, tome xci. p. 469.

Ethyl Bromide an Anæsthetic in Minor Surgery.—DR. J. E. KEMPTER makes a plea for a more extensive use of this drug, on the ground of its comparative safety, quoting German statistics to show that of 60,000 patients thus anæsthetized there were but sixteen deaths. Ethyl bromide is prepared by decomposing potassium bromide with ether in the presence of alcohol. Cardiac depression follows only when anæsthesia is prolonged or an impure preparation is used. Its main advantage is rapid anæsthesia. Heart lesions do not contraindicate its judicious use. Brief operations, such as tonsillotomy, are satisfactorily performed. In an ether cone two to three drachms are poured (one to two drachms for children), and the administration is like that of ether, no admixture of air being permitted. The cone is not removed until full anæsthesia is induced, and this is recognized by cessation of struggling. Usually one minute produces deep anæsthesia, which lasts one, rarely two, minutes. Nausea and vomiting are rare. Neither heartbeat nor pulse is influenced, as a rule. Corneal reflex is present, with primary mydriasis. Cyanosis is uncommon. The patient awakes suddenly, the mind is clear. Headache, somnolence, and amaurosis are after-effects sometimes noted. Ethyl bromide is volatile and liable to decomposition.

The inhaler should be at once applied. A fresh preparation is requisite. Exposure to light or air results in compounds more toxic than ethyl bromide. The adult anæsthetic dose must not exceed three drachms. When pure the drug is a colorless liquid, non-inflammable, with an ethereal odor and hot, saccharine taste.—*Maryland Medical Journal*, 1899, vol. xlii. p. 133.

Salt Water Infusion in Acute Disease.—DR. LENHARTZ makes use of subcutaneous salt water infusions in typhoid fever, acute infectious pneumonia, severe dysentery, peritonitis, perityphlitis, and ecphyaditis. Marked diuresis, with a lowering of the specific gravity of the urine, follows, and this indicates a washing-out of the tissues. The quantity used varies from a quart for adults to three or five ounces for children. It is better to begin with small quantities in order to avoid over-distention of the heart.

DR. JOLANE considers this method dangerous in pneumonia, but found it excellent in hysterical vomiting.

DR. RUMPF found it excellent in uræmia when used in conjunction with blood-letting, but obtained negative results in diabetes, besides incurring the danger of gangrene.

DR REICHE, in contrast with the above-cited criticism, has obtained good results in pneumonia, believing that the danger is to be guarded against in the kidneys and other parenchymatous organs rather than in the heart.—*Therapeutische Monatshefte*, 1899, Heft 8, S. 441.

A Case of Colocynth Poisoning.—An improvised tincture of an entire colocynth "apple" in four ounces of gin was swallowed as an abortifacient. One hour later there were faintness, vomiting, and epigastric pain. A watery, large, blood-tinged stool followed, and a little later a convulsion. Temperature normal, pulse 62, weak and irregular. Patient was frequently delirious. Emesis occurred about thirty times in the first twenty-four hours. There were two convulsions and four blood-stained stools. Next day extreme prostration and epigastric pain were noted, and ten evacuations from the bowels; also three attacks of vomiting. Prostration and epigastric pain marked. For five days the dejecta numbered at least nine daily, and were regularly blood-tinged. No febrile movement. Treatment: Morph. sulph. a quarter grain, and atropine sulphate one hundred and fiftieth of a grain, hypodermatically, twice on first and second days, once on third day; also bismuth subnitrate, cocaine hydrochlorate, and lime-water in mixture (amounts not stated) for three days. Thereafter bismuth subnitrate alone was given every three hours in fifteen-grain doses. Fomentations to epigastrium and abdomen gave much relief. Forty grains of colocynth have proved fatal, and recovery has followed the taking of three drachms. In this instance between three and four drachms were swallowed. Apart from the intense gastro-enteritis, the main toxic effects were depression of the circulatory and central nervous systems. Abortion did not result.—*New York Medical Journal*, 1899, vol. lxx. p. 343.

Poisoning by Sulphonal or Trional.—DR. HORATIO C. WOOD, JR., states that chronic sulphonal poisoning has become of late so comparatively frequent that only too many physicians know the symptoms of this fatal intoxication from experience. The first signs are so unsuggestive that they are often not noted, the diagnosis not being made until the patient's death-warrant is read in the blood-red urine. There are, for example, complaints of nausea, of general lassitude and weakness; nearly always there is also disturbance of the bowels, either slight serous diarrhœa or obstinate constipation, preceding the outbreak of the pathogenic symptoms. None of these conditions occurs in a neurasthenic woman—which class furnishes the large majority of instances of poisoning and attract the attention of the physician. In the advanced stages the symptoms are more uniform; colicky pains about the epigastrium, vomiting and absolute constipation, which hardly yields to the most severe measures. There are manifestations of grave changes in the nervous system; the sense of weakness becomes, perhaps, an absolute paralysis, occasionally more or less general, but more commonly limited to small groups of muscles. Almost always there is marked ataxia of both arms and legs. Finally, to render the diagnosis beyond doubt, we have the port-wine urine, due to the presence of hæmatoporphyrin, probably a derivative of hæmatin, of high acidity, and later albuminous. The symptoms of trional poisoning resemble those caused by sulphonal, but with certain differences. These are: Premonitory symptoms due to nervous changes—headache, very commonly giddiness, staggering gait; and paralysis, even to loss of control of sphincters, and almost complete loss of power of motion. A slight watery diarrhœa may change abruptly into constipation. The most important point in the treatment of poisoning from either substance lies in the prophylaxis. Of twenty instances of sulphonal poisoning, seventeen had a fatal termination; of nine from trional, three died. Twenty-six of the twenty-nine were women, and a considerable proportion were not under the close observation of the physician. An important precaution is to prevent the accumulation of the poison in the body. Interruption in the use of the remedies should be at least for one week, and the intestinal canal should be thoroughly cleansed out, so that no undissolved remnant of the drug is left. The poison must be stopped at the first appearance of toxic symptoms, and the bowels promptly emptied. Since the urine is likely to be highly acid, sodium bicarbonate or magnesium carbonate may be employed; the former may be combined with sodium sulphate. Large amounts of water should be introduced into the circulation, both by the intestinal tract and by the subdermal tissues, in order to aid in the elimination of the poison. The convalescence is likely to be very slow, often lasting several months.—*Merck's Archives*, 1899, No. 11, p. 460.

[About two years ago we called attention elsewhere to the dangers arising from prolonged administration of these drugs. The ease with which patients can obtain hypnotics for self-administration, and the slight importance which they attach to their use, may lead the physician to overlook the premonitory symptoms until the patient is found in a critical condition. Inquiry should be made as to these facts of all patients, and especially of women who present the symptom-complex of neurasthenia.—R. W. W.]

Treatment of Cardiac Asthenia of Pneumonia.—Dr. H. L. Elsner lays emphasis on the fact that in addition to cardiac weakness there is also paralysis of the vasomotor system and dilatation of the peripheral vessels, particularly the arteries. He considers the cardiac asthenia due to a toxæmia, causing, in addition to vasomotor and right heart paralysis, degenerative changes in the muscle and heart clots. In addition there is obstruction in the pulmonary circuit. Arguing from these premises, he objects strongly to the use of all remedies that reduce vitality; cardiac depressants, except cold, are contraindicated. Nitroglycerin is especially to be avoided, as it increases vasomotor paralysis; the drug may occasionally be of service in contracted arteries, usually seen where intestinal nephritis is a complication.

If the right heart is overtaxed and dilated, venesection is a far more rational treatment. Veratrum viride is placed in the same category as nitroglycerin. Digitalis and strychnine are both powerful stimulants to the vasomotor centres, and meet the conditions admirably. Hypodermatic administration is of great importance. Rather large doses of both drugs are recommended. Diffusible stimulants are invaluable to counteract the cardiac asthenia itself. Their evanescent action can be overcome by repetition at short intervals. Another dose must follow before the effect of the preceding dose has vanished. The writer recommends: Compound spirit of ether, aromatic spirit of ammonia, compound spirit of lavender, fifteen drops of each. To these is added tincture of valerian (same amount), producing a "quieting" (?) effect, when given in these small doses with the above stimulants. Sometimes the mixture cannot be retained when valerian is present, and whiskey or brandy is substituted in equal dose. Where the Hoffmann's anodyne is distasteful it can be omitted, and the dose of the ammonia and lavender is doubled. Spartein sulphate in quarter-grain doses with caffein, four to six grains, is given every two to four hours. Tokay wine is recommended as by far the best alcoholic stimulant, dose, a tablespoonful every half-hour, and given with the ethereal stimulant when due. Sometimes high rectal injections of coffee and whiskey, with hypodermatic injections of ether and oil (?), are indicated to tide over periods of collapse. Oxygen is mentioned, but without enthusiam. To carry out this treatment skilled assistants are absolutely requisite. No statistics are given, but the statement is made that patients have been saved in whom a favorable result was not anticipated. —*The Therapeutic Gazette*, vol. xxii., No. 6, p. 361.

Dionin.—Dr. Paul Hein prescribes this remedy in doses varying from one-third to one-half a grain, either in powder with sodium bicarbonate solution in cherry laurel water, or suppository of cocoa butter. He finds this morphine derivative midway in action between codeine and morphine, and very serviceable as an anodyne, hypnotic and sedative. Untoward symptoms may arise in patients whose myocardium is diseased, but rarely even in this condition. It seems to be quite as prompt in action when given by the rectum as by the mouth.—*Klinische-therapeutische Wochenschrift*, 1899, No. 46, S. 1482.

Therapeutic Uses of Iodopyrin.—Dr. Junkers states that in fifteen-grain doses this remedy lowers the temperature in various forms of typhoid fever and in pulmonary tuberculosis In the latter seven-grain doses, given at night, produce normal temperature, conduce to sleep, and do not give rise to phenomena of collapse. In puerperal fever it reduces the temperature, the patients feel better, and sleep ensues. That the iodine of this combination may act as a disinfectant is suggested when the fact that in a 1 : 10,000 solution it possesses antiseptic action upon septic blood. In muscular rheumatism fifteen-grain doses often cure within three days. In acute articular rheumatism pain is relieved, mobility is increased, and only rarely has sodium salicylate been, of necessity, resorted to. Over the latter it has the advantage of not producing unpleasant symptoms. In gout eight observations show that it relieves pain. In epidemic influenza the headache and other pains rapidly yield to its influence, while the sequelæ, as bronchial catarrh, are more rarely complained of. It may even be employed as a prophylactic. Various neuralgias are benefited; ischias so much that morphine is unnecessary. Intercostal and facial neuralgias are often benefited by fifteen-grain doses. Dysmenorrhœa may be successfully treated by this remedy introduced in a suppository. So-called bronchial asthma is relieved as to the air-hunger, difficult respiration and tenacious expectoration.—*Therapeutische Monatshefte*, 1899, Heft 11, S. 604.

"Wood Pulp." A Substitute for Flaxseed in Poultices.—MR. FRED. I. GORDON recommends crude unbleached sheets of wood pulp. A piece of suitable size is soaked in hot water until thoroughly soft, and lightly wrung out and applied to the skin of the patient. This material absorbs four times its weight of water. No cloths are needed. Cooking, stirring and spreading are dispensed with. Oiled muslin externally will aid in retaining the heat and moisture. None of the antiseptics is incompatible with wood pulp, and by soaking the latter in solutions antiseptic dressings can be made. To sterilize a dry sheet requires three minutes in a hot oven. For foul ulcers where charcoal is indicated, char one side of sheet for a quarter of an inch, scrape lightly, and apply a deodorant and absorbent dressing. When dry, wood pulp absorbs melted ointments and oils; thus menthol, thymol, etc., dissolved in an oil, are absorbed, and a clean salve results. The pulp makes, when scraped and moulded, excellent tampons and suppositories. Thick sheets, if soaked, can be moulded as splints; on drying, the shape is retained, they become stiff, and serve as excellent splints. Plaster-of-Paris sprinkled between thin sheets adds to their strength. Soaked in ice-water, a serviceable ice-cap is made, which, being moulded to the head, will not fall off. When cotton or lint is lacking, scraping a sheet of pulp and sterilizing the fluffy mass in a stove gives an excellent substitute. When a "jacket poultice" is required (pneumonia), sheets an inch thick should be used and covered with oiled muslin to retain heat. The sheets of wood-pulp are very light and easily transported.—*American Journal of Pharmacy*, 1899, vol. lxxi., No. 11, p. 525.

The Treatment of Bronchopneumonia in Children.—DR. D. A. HODGHEAD, from a study of twenty-five cases, reports very favorably on the use of calomel and belladonna. Other medication is stopped, poultices removed, the child is wrapped in soft, loose clothing, and water is substituted temporarily for milk. The room is to be kept at an even temperature, and the atmosphere is not surcharged with moisture. Calomel in one-tenth of a grain doses is given every hour until a free movement of the bowels is obtained, and, alternating half-hourly with the calomel, two drops of the tincture of belladonna. As improvement begins the belladonna is reduced to drop doses hourly. The temperature falls, respirations become less rapid and are deeper, rattling and large râles disappear; the moist râles become few and feeble; pulse and cough improve, and the patient can sleep and take nourishment. In the patient whose case is specially cited, belladonna rash became well marked, after which the drug was gradually withdrawn. Calomel is of value as a cathartic, even early in the disease, but the belladonna is not effective until the disease is well established, when the early, dry, congested state of the bronchi has given place to the superabundant mucus and mucopurulent secretion. Ammonia combinations liquefy and tend to increase the amount of secretion; belladonna diminishes them, stimulates respiration, thus aiding elimination. A child under five years expectorates but little. An advantage in this method of treatment is the discarding of steam-tent, ice-pack, etc. Both drugs suggested above are well borne by children. With the belladonna treatment the mortality has not been over 5 per cent., like results being obtained in three London hospitals, whereas by the older methods mortality averages 60 to 80 per cent.—*The Pacific Medical Journal*, 1899, vol. xlii., No. 6, p. 326.

On the Treatment of Abdominal Palpitations.—DR. W. WADE believes that in this condition, whatever may be the state of the somatic circulation, the abdominal aorta and probably other arteries are in a state of high tension. Small doses of nitroglycerin are usually sufficient to control the palpitations by lowering the tension in the splanchnic area. One two-hundredth of a grain is often an ample dose. By thus equalizing the circulation, miscellaneous accompanying symptoms disappear. The radial pulse becomes more full and forcible as more blood is liberated from the splanchnic area. Like treatment is also recommended for cold extremities, being due often not to insufficient heart-action but to local contraction of arterioles.—*The British Medical Journal*, 1899, No. 2007, p. 1451.

Treatment and Medical Complications of Typhoid Fever.—DR. H. A. HARE suggests the following modifications in the hydrotherapy of typhoid fever. The necessary friction and massage are not to be overlooked. The water is to be *varied* in temperature according to the persistency and degree of the fever. Seventy degrees is cold enough for patients who do not react well and have only moderate pyrexia; later, ice-water may be used. If the fever is high, ice rubbed over the surface of the body is substituted for the bath. The dose of cold varies with the needs of the individual. Properly carried out, the temperature can thus be reduced many degrees, producing a good reaction, showing that it is unnecessary to exhaust the patient by the actual plunge bath. Great confidence is expressed in the value of the active rubbing accompanying the sponging, thus aiding the reaction and increasing the loss of heat 80 per cent. (Popischil) and the loss of moisture through the skin by half (Weisrock). In the early stages of the disease the fever is most resistant to the cold sponging with friction, and this is equally true of the plunge itself. There are certain patients who do not respond to the sponging and frictions, and these are best treated by the cold plunge bath as ordinarily used.—*The American Medical Quarterly*, 1899, No. 1, p. 4.

The Injection of Saline Solutions.—DR. E. HOUÈL concludes that it is not only in diseases which are self-limited that such injections are of value, but also in such conditions as septicæmia, uræmia, dysentery, etc. The action of saline injections is to eliminate the toxic substances by a "lavage" of the cells paralyzed by the poison, to increase phagocytosis, to increase the urine, to stimulate the nervous system. The main object of the injections is the "hæmatocatharsis," and consequent clearing of the system of its toxins—*Revue de Thérapeutique*, 1899, No. 12, p. 401.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Freund's Operation for Cystocele.—WERTHEIMER (*Centralblatt für Gynäkologie*, 1899, No. 40) describes a modification of Freund's operation which consists in making a transverse incision in the anterior vaginal wall in front of the portio, so that the uterus can be drawn downward. The usual denudation is then made and its upper edges are united to the uterus. Menstruation is not interfered with, but in order to prevent conception the tubes are resected (?).

Ileus after Laparotomy.—WERTH (*Ibid.*) reports eleven cases of intestinal obstruction in one thousand abdominal sections, with six deaths. In two cases the abdomen was reopened and adhesions separated with success. In nine enterostomy was performed, with three recoveries.

In the majority of cases ileus is due to slight local obstruction with general paralysis of the gut above the site. Enterostomy offers a better prospect of recovery than reopening of the abdomen, on account of the serious condition of the patient.

Although sepsis is often the cause of ileus, it may occur after a perfectly aseptic operation from mechanical injury to the serous covering of the gut. The latter may be avoided by the adoption of Trendelenburg's posture, by making a small incision close to the symphysis, and protecting the intestines as much as possible while removing the tumor. Dangerous adhesions are most apt to occur in the neighborhood of the abdominal wound, at the stump, and in Douglas' pouch. These are prevented by carefully suturing all raw surfaces in the parietal peritoneum near the edges of the wound, by covering the stump with peritoneum, and by temporarily excluding the coils of intestine from Douglas' pouch, by over-distending the bladder. If the bladder is filled with sterilized boric acid solution during the operation, the additional advantage is gained of causing the patient to urinate spontaneously afterward. The writer is opposed to the use of purgatives before operation, believing that they are more likely to cause subsequent atony of the intestine. He prefers phosphate of codeine to morphine, as it is less likely to hinder peristalsis.

Complete Prolapse of the Uterus in the Virgin.—STEPKOWSKI (*Revue de Gyn. et de Chir. Abdom.*, 1898, No. 5) in reporting a case of procidentia in a young woman due to prolonged coughing and the carrying of heavy burdens, refers to Neugebauer's statistics, in which only seven cases of complete prolapse are noted among 28,000 cases, or 1 in 4000.

Peritoneal Adhesions.—GERSUNY (*Archiv. für klin. Chir.*, Band lix. Heft 1) describes a case in which an adhesion was found at the beginning of the sigmoid flexure, extending across the outer layer of the mesocolon. It was not recognized until the colon was drawn toward the median line. The clinical symptoms were constant pain in the lower part of the abdomen, violent pains in the left side before defecation, chronic constipation and tenderness over the appendicial region, as well as at a corresponding point on the left side.

The writer states that he has operated upon twenty-one cases of a similar character, and believes that adhesions at the sigmoid flexure are not rare, but are readily overlooked because they are often complicated by appendicitis and pelvic disease. Hemorrhages into the peritoneal cavity are doubtless responsible for the formation of adhesions. Such hemorrhages may be due to injuries or to the rupture of Graafian follicles and the escape of blood from the tubes. Possibly some cases of appendicitis may be secondary to adhesions thus produced. The treatment is surgical abdominal section and separation of the pseudomembranes.

Operations for Prolapse of the Uterus.—V. HERFF (*Centralblatt für Gynäkologie*, 1899, No. 41) was able to trace 253 out of 283 cases of prolapse treated at the Halle clinic between 1894 and 1898. The usual operations were amputation of the cervix, with anterior and posterior colporrhaphy, often supplemented by vaginofixation or vesicofixation. Ventrofixation was only employed after other methods had failed, or when it was necessary to open the abdomen for other purposes. Hysterectomy was confined to the most obstinate cases. Freund's operation was not successful.

Cases were regarded as cured only when no prolapse of the vaginal walls was noted on severe straining. Of the lighter cases 50 per cent. were cured, while in 15 per cent. of the bad cases the patients were able to perform their usual work. Relative cures were obtained in 78 per cent. after vaginofixation or vesicofixation, and in 77 per cent. after both plastic operations and ventrofixations. Subsequent labors caused the greatest number of recurrences (28.9 per cent.). Cystocele returned most frequently, less often prolapse of the uterus, and rectocele least frequently of all.

The principal cause of failure is relaxation of the tissues—a factor which cannot be eliminated, although they may be strengthened by gymnastics. Imperfect restoration of the pelvic floor, non-union, and fresh lacerations which are not properly repaired are also responsible. The writer regards a firm perineum and a narrow vaginal outlet as most essential to a permanent cure.

Intraperitoneal Infusion of Saline Solution.—EICHEL (*Archiv für klin. Chirurgie*, Band lviii. Heft 1) adopts the following plan of gradually introducing saline solution into the peritoneal cavity after severe operations: Before closing the wound a No. 18 catheter is inserted at the lower angle and carried down into Douglas' pouch. The wound is sutured in the usual manner, and the catheter is cut off and its end secured with a wire suture and attached to a glass irrigator. After the dressings have been applied a continuous flow of saline solution is begun and maintained for twenty-four hours at the rate of one cubic centimetre a minute. This is effected by compressing the supply-tube with a clamp fitted with a millimetre screw. About three pints of fluid are introduced in twenty-four hours.

A case of rupture of the liver, with profuse hemorrhage, is cited, in which three quarts of saline solution were injected into the peritoneal cavity in two days, the patient making a good recovery without any other stimulation. It was estimated that fully two quarts of blood were lost.

The Mobility of Tumors.—PAGENSTECHER (*Deutsche Zeitschrift für Chirurgie*, Band l., Heft 1 and 2) conducted a series of experiments on the cadaver, using a rubber ball which he sutured at different points within the abdominal cavity. He infers that cysts of the mesentery are quite movable, and may descend even into the true pelvis. Floating kidneys and spleens, and even gastric tumors, may have the same range of motions. Mesenteric tumors, however, are more superficial, and when at rest are situated in the middle of the abdomen at one side of the umbilicus. A movable kidney gravitates toward the lumbar region when the patient assumes the dorsal position, but sinks downward in the erect posture, lying behind the intestines.

Foreign Bodies in the Abdominal Cavity.—BUSHBECK (*Centralblatt für Gynäkologie*, 1899, No. 45), in a paper on this subject read before the Dresden Gynecological Society, reports a case in which a gauze pad was retained in the peritoneal cavity for two and one-half years after operation, being discharged through a fistula in the abdominal wall, which communicated with the intestine. A perfect cure followed resection of eight inches of the gut. In the discussion which followed cases were reported by Leopold and Meinert.

Papillary Tumors of the Fallopian Tube.—MACREZ (*La Gynécologie*, October 15, 1899), in an elaborate paper on this subject, in which he analyzed all the reported cases, presents an interesting résumé of the pathological anatomy of these growths, which he divides into three classes, viz., papilloma, adenoma, and epithelioma. The first two varieties are often found in the same specimen, when the neoplasm is properly called adenopapilloma. It is possible that the true papillomatous form may represent an early stage, the adenomatous being a later development. The benign growth may undergo epitheliomatous degeneration.

There are no definite signs of benign papilloma of the tube unless the frequency of so-called *hydrops tubæ profluens* and ascites may be regarded as possible indications.

In the evolution of papilloma the initial stage is probably a simple salpingitis. In consequence of this lesion papillary formations develop, the epithelial cells of which secrete an irritating fluid which is not an inflammatory exudate. Adenoma develops subsequently, while epithelioma of the tube is to be regarded not as a primary neoplasm, but as the last stage in the process of evolution.

As regards the prognosis, the age of the patient and the extension of the disease point to malignant degeneration. The presence of a hydrosalpinx with a profuse watery discharge from the vagina, and ascites furnish a clear indication for immediate operation, since the tendency of papillomata to become malignant is undoubted.

Pathology of Uterine Fibromyoma.—TRIDONDAIN (*Archivio Italiano d'Gin.*, June 30, 1899) believes that fibromyomata develop from the muscular fibres in the walls of the small uterine arteries, which are found in the zone of elastic tissue which surrounds the fibrous nodule. The latter is neither the result of a local irritation, nor is it the product of congenital inclusion, but is an expression of abnormal activity in the entire genital system, which has its most striking manifestation in the uterus.

Myxomatous Degeneration of Fibroids.—JOUSSELIN (Paris Thesis: *La Gynécologie*, October 15, 1899) rejects this designation of mucoid degeneration as incorrect, since the condition is really due to the secretion of a colloid material by the embryonic cells of the tumor. He suggests "colloid infiltration" as being more exact.

This change usually occurs in fibroid tumors after the climacteric, and is not indicated by any clinical symptom when it begins in the centre of the neoplasm. If general, it may lead to a rapid enlargement of the tumor, with resulting compression symptoms and to profuse hemorrhages. It may be impossible to distinguish colloid infiltration from malignant degeneration. Colloid cystoma of the ovary may readily be mistaken for it.

Recurrence after Vaginal Hysterectomy for Cancer of the Uterus—OLENINE (Paris Thesis: *La Gynécologie*, October 15, 1899) calls attention to the fact that while 420 patients with cancer of the uterus were treated at the Kasan clinic between 1886 and 1897, only fifty-four cases were suitable for operation, and of these but thirty-three were really favorable. Seven patients died from the operation. Of the remaining forty-seven, thirty-seven were traced; twenty patients were free from recurrence, eight being well at the end of six years. The writer thinks that these results are quite encouraging, since over 50 per cent. of the patients showed no evidences of a return of the disease.

Modification of Hegar's Method of Colporrhaphy.—BLANKOFF (Paris Thesis: *La Gynécologie*, October 15, 1899) describes the following method suggested by Schwartz: The same surface is denuded on the posterior vaginal wall as in Hegar's operation. Catgut sutures are passed not transversely as usual, but parallel to the long axis of the vagina. The sutures include almost the entire thickness of the rectal wall, so that when tied the rectocele is entirely obliterated. The object of the operation is to furnish to the pelvic floor the maximum power of resistance.

The Effect of Amputation of the Cervix Uteri on Pregnancy and Labor.—CHALEIX-VIRIE (Paris Thesis: *La Gynécologie*, October 15, 1899) reports seventeen cases of amputation of the cervix in which the subsequent history of the patients was obtained. Pregnancy occurred twenty-three times, with nineteen deliveries at term. Full dilatation of the cervix varied from three to nine hours. Seventeen children were born spontaneously, forceps being used only once. No children died. In all cases a thorough excision was performed according to Schroeder's method. The writer concludes (contrary to Pinard's view) that the operation has absolutely no harmful influence upon subsequent pregnancy and parturition.

Influence of Diabetes on the Female Genital Organs.—DANCKWORTH (Inaugural Thesis; abstract in *Centralblatt für Gynäkologie*, 1899, No. 23), from a study of the records of the Halle clinic, finds that pruritus vulva is the initial symptom of diabetes in about 20 per cent. of the cases. Premature menopause is relatively common in diabetics, which may be due to degeneration of the nerves of the genital tract in consequence of impaired general nutrition. Endometritis is often present.

Marriage should be forbidden to diabetic women, in consequence of the deleterious influence of pregnancy and the puerperium.

Lipomyoma of the Uterus.—BRÜNINGS (*Ibid.*) reports the case of a patient, aged fifty-five years, from whom he removed a fibromyoma the size of a child's head. Microscopical examination showed that the tumor was partly transformed into fat in consequence of degeneration of the muscular tissue. The muscle cells contained large vacuoles filled with fat globules. In many places the protoplasm was much swollen, the cell having several nuclei. The same condition existed as in progressive muscular atrophy.

Influence of the Menopause on Cardiac Lesions.—HOSTKIEWITZ (*Archives russe de pathologie; La Gynécologie*, April 15, 1899) arrives at the following conclusions as the result of observations extending over five years. In certain women the menopause is attended with functional cardiac neuroses; if these are added to pre-existing organic lesions the result may be fatal. Asystole is one of the most important results of these neuroses. Patients with arterial sclerosis, without valvular lesions, resist the climacteric disturbances best, while those with disease of the pulmonary or mitral valves are most affected. Dilatation of the cavities of the heart, or of the aorta, tachycardia and arhythmia in women at the climacteric do not bear a direct relation to the degree of arterial sclerosis. Aggravation of the cardiac symptoms is observed at intervals corresponding to the menstrual periods, with corresponding periods of amelioration, but the attacks may become more severe and prolonged until they terminate fatally. If menstruation reappears there is usually a distinct improvement in the symptoms. In general, the disturbed mental and physical condition of the patient at the time of the menopause exercises an important influence upon the cardiac neuroses of this period.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Treatment of Fever Following Delivery.—At the last meeting of the British Medical Association, SPENCER opened a discussion upon this subject. He divides puerperal fevers into four classes. The first is that occurring about the third day, the temperature rising to 102° F. and yielding promptly to the administration of a purgative. Where emotional causes are present the temperature may be much higher, but promptly subsides.

In the second class of puerperal fevers he places those caused by diseases having no connection with labor. Such are influenza, scarlatina, acute tubercular infection and typhoid. Influenza is, in his opinion, more frequently diagnosticated than actually found in the puerperal condition. In some cases, however, this condition is undoubtedly present. Scarlatina is very rare in the puerperal period, and most cases so diagnosticated are septic, with an anomalous rash. Acute phthisis is often mistaken in the puerperal period for pneumonia, as the physical signs correspond. It does not yield to treatment, and the discovery of the bacillus establishes the diagnosis. In typhoid the differential diagnosis may be difficult, and can often be established by the use of the Widal test.

In the third class of fevers Spencer places infection from pre-existing lesions, such as ovarian and fibroid tumors, cancer, stone in the bladder or ureter, pyosalpinx, and appendicitis. Patients giving a suspicious history should be thoroughly examined during pregnancy, and the complicating lesion removed, if possible. These cases require operation of some sort in almost every instance.

The fourth class of fevers is due to external infection, and is seen clinically in three forms. The first is acute septicæmia, which terminates fatally within a few days. The second is lymphatic septicæmia, the usual form beginning with a chill; this extends into the peritoneum; the third is pyæmia or venous septicæmia, characterized by a succession of chills and by the formation of abscesses. The placental site usually sloughs in these cases.

Mild cases of puerperal sapræmia or poisoning by the chemical products of micro-organisms are often seen, and usually result in recovery.

As regards the treatment of these conditions, he urges the routine examination of every patient toward the end of pregnancy. In this way not only is the size of the pelvis ascertained, but also the presence or absence of complicating lesions. Vaginal examinations are made less frequent, and the chances of infection are much diminished. The third stage of labor must also be carefully conducted, and the womb should be left clean and empty. He draws attention to disinfection of the hands, for which he prefers bichloride of mercury, and urges the disinfection of the vulva in every case.

When septic infection is present the uterus should be examined as soon as possible. The interior should be thoroughly explored and all retained material at once removed. The operator should use rubber gloves, thus avoiding danger to himself and to other patients. Care should be taken that no violent effort be made to empty a septic uterus. Only that tissue should be removed which has become partially loosened by pathological processes. The uterus should be washed out by a glass tube. When the peritoneum is involved Spencer has waited until the fluid became localized, and then has opened the collection through the abdominal wall or Douglas' pouch. The uterus should be removed when it is the site of carcinoma or contains a fibroid which cannot be enucleated. He strongly deprecates the use of antipyretics, but prescribes stimulants freely. He is not inclined to favor the use of antistreptococcic serum.—*British Medical Journal*, October 14, 1899.

The Influence of Rest or Work Upon the Development of the Fœtus in Utero.—In the *Revue Pratique d'Obstétrique et de Pediatrie*, 1899, No. 135, Bachimont gives the results of his observations regarding the effect which rest or active labor has upon the fœtus *in utero.* His general conclusions are that the weight of a child born after the mother has had two or three months' quiet and freedom from toil is at last 340 grammes greater than the weight of a child born of a mother who has worked actively up to the time of labor. The writer made an investigation in 225 cases of twin pregnancy occurring at the Baudelocque Clinic in Paris with reference to the point in question. He found that 112 of these patients had rest during the latter part of pregnancy, forty-nine had not. In fifty-three no history was given, and in eleven some pathological condition complicated the pregnancy.

Among those cases in which the mother had rest there was but one child stillborn. The majority of the children distinctly exceeded in weight the average child.

Among the 104 children in whose case no history of rest was obtainable, seven were stillborn, showing a great increase in mortality over the first group of cases.

A further study of these cases shows that the women who had opportunities for rest before labor had a longer pregnancy than those who had not. Thus their average duration of gestation was 269 days, while in the case of the others it was 247 days.

Rupture of the Uterus at Full Term; Missed Labor; Delivery Nine Weeks Later.—Cameron (*British Medical Journal*, October 14, 1899) reports the case of a multipara who at full term had severe labor pains with profuse discharge of water. She had a bloody discharge, and her attendant reported that the womb was partly dilated. She remained in this condition for about two weeks, when she was seized with acute pain in the left side and general enlargement of the abdomen. Her labor pains ceased, and she lay in bed for three weeks unable to rise. She was visited regularly by her medical attendant, an uneducated practitioner. She finally left her bed and walked about a mile, but the next day there was bleeding, and another physician was summoned. He found a round tumor on the left side of the abdomen. On internal examination there was great difficulty in reaching the os, but a hard, smooth, round body was felt lower down. Later on, under chloroform, the os was dilated and the child's head found with the parietal bones approximated. Version was performed and the child delivered. The physician could not, however, find the placenta nor the uterine wall. The child's head was greatly flattened. It had been dead for some time and was soft, but showed no sign of decomposition. The umbilical cord was ruptured close to the abdomen, and there was no trace of a fresh separation of the cord. Cameron was summoned two days later, and on examination passed the hand through the vagina into the abdomen, and brought down the cord and traced it to the placenta, attached at the right iliac region. The woman died three days after delivery.

This remarkable case illustrates the tolerance of the abdomen to the dead fœtus when septic infection does not occur.

The Diagnosis and Treatment of Suppurative Inflammation in the Eyes of the New-born.—In the *Centralblatt für Gynäkologie*, 1899, No. 41, AMMON gives the results of his clinical studies upon this question. He has found the incubation period of gonorrhœal ophthalmia to be at the longest three days. He believes that most cases of ophthalmia in the new-born arise from lack of cleanliness on the part of parents and nurses.

He has observed many severe cases in which gonococci were not present. Among these was infection by the pneumococcus, causing a violent conjunctivitis which suddenly subsided in four or five days. In ill-nourished children staphylococci can set up very severe and dangerous inflammation. The use of nitrate of silver is by no means successful in all cases, and predisposes to late infection through its effect upon the cells of the conjunctivæ. He is not in favor of allowing ignorant persons to use silver solution, and believes that this custom has resulted in the spread of ophthalmia.

In treating these cases he believes that weak solutions of protargol are best, and he has seen good results by irrigating the eyes twice daily with sterile salt solution, making applications of ice every three minutes. Cases of corneal ulceration have done especially well under this treatment. He is accustomed to smear the lids with vaseline and to tie the hands of the child. He is much opposed to any plan of treatment which requires the use of irritating substances in the eye. In the later stages of the case he uses protargol in 10 and 20 per cent. solutions, and after three weeks often employs sulphate of zinc.

Cramer in a paper upon the same subject stated that he could not distinguish clinically between gonorrhœal ophthalmia and that which does not result from gonorrhœa. He has found pneumococci, the colon bacteria, streptococci, staphylococci and the diphtheria bacillus as causes of this inflammation. In some instances he has seen this complication follow infection by the bacteria contained in the lochial discharge. In cases of pneumonia the mother's sputum may convey the germ. Infection may occur in labor through the partial opening of the lids. He believes that if the eyes are not irrigated bacteria seldom do harm. When, however, silver has been used, he considers bacteria increased thereby, and the conditions made favorable for a secondary infection. He prefers other disinfectants than silver. He has employed protargol in 20 per cent. solution with good results.

In the discussion of this paper several expressed their belief that the use of silver predisposes to later infection of the conjunctivæ.

Labor Complicated by Posterior Rotation of the Chin Terminated Successfully by Forceps.—In the *Transactions of the London Obstetrical Society*, 1899, vol. lxi. p. 280, LEWERS describes his success in the delivery of a patient who was in labor with a face presentation of the fœtus. The chin was directed backward and to the right. The os was fully dilated and the membranes had been ruptured for some time. The ordinary forceps had failed in delivery. Axis traction forceps was then applied, the head grasped securely, and traction made in the axis of the pelvis. The chin rotated forward, and the child was delivered. It was apparently stillborn, but was revived by artificial respiration, and subsequently did well. Facial paralysis persisted for some weeks, but ultimately disappeared.

This is the second case in which Lewers has succeeded in delivering a patient with axis traction forceps when the chin had rotated posteriorly.

Antero-posterior Positions of the Head as a Cause of Difficult Labor.—MCKERRON (*Transactions of the Obstetrical Society of London*, 1899, vol. xli. p. 142) reports two cases in which antero-posterior position of the head complicated labor.

The first was a multipara, slender in stature, and below the average height. Her previous labors had been hard, most of them requiring the use of forceps. When the patient was seen in labor the pains were diminishing in strength and in frequency, and the patient complained of exhaustion. The head was movable above the brim, the occiput anterior. The posterior fontanelle could be felt clear of the anterior lip of the os and near the symphysis, the sagittal suture running directly backward. Chloroform was administered, and traction made with the forceps, but without success. The forceps threatened to slip, and accordingly were removed and a more thorough examination made. The head seemed of normal size. The anterior fontanelle was just above the promontory of the sacrum. It was evident that the head was in an antero-posterior position, with its long axis presenting in the antero-posterior diameter of the pelvic brim. As descent was impossible in that position, the occiput was rotated slightly backward, so as to bring the head in the oblique diameter of the pelvic brim, when the head with moderate traction passed into the pelvis, and the patient was readily delivered. The child died three days afterward, and no autopsy could be obtained. The mother recovered. The examination of her pelvis showed it to be symmetrically contracted.

In the second case the patient was a multipara, a robust woman, at the end of the first stage of labor. The head was freely movable above the brim, but the membranes ruptured during examination. Strong pains came on, but the head remained above the brim, and but little pressure was exerted upon the cervix. The head was in an antero-posterior position, and descent was impossible. The occiput was cautiously rotated slightly backward to bring the head in an oblique diameter, and labor was easily terminated by forceps. The child apparently did well, but died suddenly on the third day.

At autopsy the subdural space was distended with blood, which had gravitated to the base of the cranial cavity and into the subdural space of the spinal cord. The lateral ventricles contained serous fluid. There was no fracture of any of the cranial bones, and the source of bleeding could not be traced to any one vessel.

An effort was made to measure the internal conjugate by the hand during the labor, and it was thought to be 8 cm. The external measurements of the pelvis showed it to be symmetrically contracted and of a moderate degree of contraction.

DERMATOLOGY.

UNDER THE CHARGE OF

LOUIS A. DUHRING, M.D.,
PROFESSOR OF DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA,

AND

MILTON B. HARTZELL, M.D.,
INSTRUCTOR IN DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

Multiple Epithelioma Developing upon Lupus Erythematosus.—PRINGLE (*British Journal of Dermatology*, January, 1900) reports the following case: A woman, aged thirty-six years, came under observation in March, 1890, presenting an active erythematous lupus of the nose, temples, cheeks, chin, and scalp, this last region being affected to an unusual extent, the greater portion of the scalp being transformed into scar tissue. Seven years later she again came under observation, presenting at this time two nodular growths upon the scalp typically epitheliomatous in appearance. These growths were excised. During the following two years fresh epitheliomatous manifestations appeared. Microscopical examinations of these growths showed them to be squamous epithelioma.

The Alterations of the Skin Occurring in Lymphatic Leukæmia and in Pseudoleukæmia.—PINKUS (*Archiv für Dermatologie und Syphilis*, Band l., Heft 2) concludes a paper upon this subject as follows: The tumor-like localizations occurring in the skin in lymphatic leukæmia cannot be distinguished from those occurring in pseudoleukæmia; they are clinically and histologically identical. The cases of so-called mycosic erythrodermia stand in close relation to the leukæmic skin localizations, which are not to be reckoned as belonging to mycosis fungoides, but as belonging to the lymphodermia perniciosa of Kaposi. These form a group which is characterized by erythrodermia (an eczema-like condition with redness, swelling, itching), the occasional occurrence of marked thickening of the skin, and in some cases actual tumor formation, and the coexistence of lymphocythæmia. The diagnosis of such cases can only be definitely made after the appearance of the skin and lymph-gland tumors. Histologically the leukæmic skin tumors consist of a collection of lymphocytes in the corium and subcutaneous tissue, which, at the site of the tumors, arises from previously normally present lymphatic tissue, and not from lymphocytes supplied by the blood-vessels. It is in a certain sense a lymphatic granulation tumor.

The Etiology of Ecthyma Gangrænosum.—HITSCHMANN and KREIBICH (*Archiv für Dermatologie und Syphilis*, Band l., Heft 1) report a third case of ecthyma gangrænosum. The patient was a greatly emaciated infant, six weeks old. Over the buttocks, the thighs, the abdomen, and in the popliteal spaces were twenty-five to thirty lesions, varying in size from a lentil to a small coin, covered with necrotic detritus. Some of these lesions exhibited a central depression. Microscopical examination of the lesions revealed the presence of a bacillus, which cultures proved to be the bacillus pyocyaneus. From the three cases studied by the authors they conclude that the bacillus pyocyaneus is the exciting cause of this affection, which occurs in highly cachectic children, and is characterized by the appearance of red-brown or dark-brown discolorations of the skin, usually surrounded by a halo. The centre of these efflorescences speedily becomes necrotic.

A Case of Chronic Interstitial Nephritis in which Dermatitis Exfoliativa Supervened.—DUCKWORTH (*British Journal of Dermatology*, January, 1900) reports the case of a woman, aged fifty-nine years, who, after having been ill five months, developed a rash all over the body "like measles." This disappeared in two days' time, and was followed by desquamation. Two or three months later she suffered from a universal dermatitis, the skin being dry and harsh, and covered with thin, white scales lying on an erythematous base. Behind the ears were some small moist eczematous patches, and the scalp was covered with fine scales. The entire surface was tender to pressure. The eyelids were puffy, and there was œdema of the feet and legs. The urine was acid and contained albumin. After a time the patient became drowsy, the urine scanty, and death from uræmia followed. The author regards the appearance of albuminuria in the exfoliative dermatitis of elderly people as an unfavorable factor, and the occurrence of ordinary eczema over large areas in elderly subjects with chronic nephritis is of evil omen. Inunction with pure olive oil is the best local treatment.

A Case of Blastomycetic Dermatitis Engrafted on Syphilitic Ulcers—ANTHONY and HERZOG (*Journal of Cutaneous and Genito-urinary Diseases*, January, 1900) report the following case: A man, aged forty-four years, presented numerous ulcerative lesions upon the foot and leg, many of them being covered with fungous granulations projecting a considerable distance above the surface of the sound skin. These ulcers followed an erysipelas of the leg, which had occurred some twenty years previously, and from the time of their first appearance the leg had never been freed from ulceration. A diagnosis of syphilis was made; but, with the view of investigating the possibility of the vegetating character of the ulcers being due to a subsequent blastomycetic infection, a microscopical examination of some of the lesions was made. The histological changes found corresponded with those described as characteristic of blastomycetic dermatitis, and numerous blastomycetes were found.

Anæsthetic Prurigo as a Symptom of Alcoholic Intoxication.—GASTOU (*Annales de Dermatologie et de Syphiligraphie*, 1899, No. 11), at a séance of the Société Francaise de Dermatologie et de Syphiligraphie, called attention to a form of prurigo symptomatic of chronic alcoholic intoxication. There is violent pruritus, much more severe at night, accompanied by restlessness and insomnia. The papular elements of prurigo are present in almost all cases, but in varying degree; in some the lesions are few in number, and but slightly excoriated; in others they present the type of prurigo ferox. Under the influence of external irritants the lesions may undergo various modifications; eczema-like patches may be produced, or patches resembling ringworm; or lichenification may occur, or suppuration having the appearance of a grouped folliculitis or an impetigo. In addition to this pruritus there is a diffuse, irregular anæsthesia occurring in patches. This anæsthesia is profound, follows the pruriginous elements, and is localized in the pruriginous areas.

A Case of Erytheme Indure des Scrofuleux of Bazin.—C. S. DADE (*Journal of Cutaneous and Genito-urinary Diseases*, July, 1899) reports a case of this rather rare disease (with two photographs), and concludes, from the histological and bacteriological findings, that the disease is not entitled to be regarded as tuberculous, and thinks that it should be regarded as a simple subacute inflammatory manifestation, keeping the title "erythema induratum," but dropping "of the scrofulous." The disease in this case, as in many others that have been observed, had much in common with erythema nodosum, but nevertheless differed from it.

[Audry, in the *Annales de Dermatologie et de Syphiligraphie*, 1898, came to the same conclusion as Dade, that it was not scrofulous, but seemed to be rather a chronic form of erythema nodosum.]

A Case of Sclerema Neonatorum.—PRINGLE (*British Journal of Dermatology*, July, 1899) reports in brief a case of this disease occurring in a male child, aged six weeks. The child was born in a hospital, and nothing abnormal was observed concerning the skin until the child was two weeks old. There were two symmetrical bands of deeply infiltrated and nodulated skin lying longitudinally over both deltoid regions. They stood out boldly above the general surface, and were of faint, purplish tint. There was also an extensive area of sclerematous skin of more usual type over the lower dorsal and lumbar regions, which (in the opinion of the reporter) established the diagnosis.

[The case has apparently more in common with morphœa than with sclerema neonatorum.]

Psoriasis and Glycosuria.—NAGELSCHMIDT (*Berliner klinische Wochenschrift*, January 8, 1900; *Journal of the American Medical Association*, February 10, 1900), after reviewing the reported cases of psoriasis associated with diabetes, describes in detail a case of Senator's: A woman, aged thirty-two years, who, with psoriasis since childhood, died from diabetic coma. In eight out of twenty-five cases of psoriasis Nagelschmidt succeeded in inducing alimentary glycosuria, while in a number of cases of other cutaneous diseases this was impossible. He concludes that there must be some connection between psoriasis and diabetes under certain circumstances.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

W. T. COUNCILMAN, M.D.,

SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY,

AND

F. B. MALLORY, M.D.,

ASSISTANT PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY.

Bacteriological Study of the Bile.—FRÄNKEL and KRAUSE (*Zeitschrift f. Hygiene*, 1899, xxxii. 97) give the results of the bacteriological examination of the bile in 130 cases—128 of them at autopsy, 2 at operation. Of these, 105 were sterile, 25 were not. Of the 25, 12 were cases of cholelithiasis, 4 acute infectious diseases, 4 cases of peritonitis, 3 abdominal operations. In 2 the diagnosis was indefinite.

Of the entire number, 36 were cases of tuberculosis; 34 of these were sterile by the ordinary method of examination. Of these 34, the bile from 11 was inoculated into guinea-pigs. Five of the pigs became tuberculous.

Their method of making cultures was to ligate the bile duct, remove the gall-bladder, wash in running water, let stand in corrosive sublimate solution (5 to 1000) for three minutes, then in sterile water a few minutes, dry with a sterile towel, singe an area with a Bunsen flame, and open with sterile scissors, catching the bile in a sterile test-tube. Plates of glycerin agar were made from this, three attempts being made if the first and second were sterile. Cultures of the typhoid bacillus, bacillus prodigiosus, and streptococcus were injected into gall-bladders which subsequently received the same treatment. This was done to prove that the sublimate does not injure by diffusion. Fifteen of the cases were also cultivated anaërobically. The time of autopsy was from one to forty hours after death; most of them were less than twenty-four hours.

They then investigated human bile as a culture medium for pathogenic bacteria. Their method was to inoculate a tube containing 1 to 10 c.c. of sterile bile with an organism and make daily glycerin agar plates from this. They conclude that for the typhoid bacillus, colon bacillus, bacillus pyocyaneus, staphylococcus pyogenes aureus, and the spirillum of Asiatic cholera, bile is a good culture medium. The diphtheria bacillus and the streptococcus developed very slightly, while the streptococcus lanceolatus develops scarcely at all.

Cultures of the typhoid and diphtheria bacilli in bile were more rapidly fatal to guinea-pigs than cultures in bouillon. As control to this observation they first inoculated guinea-pigs intraperitoneally with sterile bile, with no fatal results and with no disturbance of health unless the quantity was large; second, in a series of rabbits and guinea-pigs they performed laparotomy, cut the gall-bladder, let bile into the peritoneal cavity, then stitched up the bladder and abdominal wall, with perfect recovery, without symptoms where asepsis was practised. A later autopsy showed only adhesions about the seat of the operation.

Changes in the Liver-cell in Jaundice.—SZUBINSKI (*Ziegler's Beiträge*, 1899, xxvi. 446) reviews the work of Fleischl, Kufferath, Harley, Nauwerck and others with reference to the manner in which the bile reaches the blood in cases of jaundice. These men have demonstrated by animal experimentation: 1. That bile acids are found in the lymph from the thoracic duct shortly after ligation of the common bile duct. 2. That if the common bile duct and thoracic duct are ligated simultaneously jaundice is prevented, but only for a time; jaundice appearing in all cases within a few days. This, too, in cases where newly formed collateral lymph channels cannot be demonstrated. 3. That if the thoracic duct be ligated at a second operation shortly after the ligation of the common duct, the jaundice which appears after the first operation can be made to disappear. If, however, a period of six days intervenes before the second operation the jaundice persists.

Von Frey and Horley believe that the bile passes into the blood through rupture of the small bile capillaries into the perivascular lymph spaces. Heidenhain thinks that it is by filtration through the walls of the bile passages in the interlobular spaces. None of the observers explains the jaundice which occurs after ligature of the lymph channels.

Nauwerck says that this is explained by absorption within the cell by means of minute pre-formed intercellular canals. He bases his view on microscopical pictures seen in a case of hypertrophic cirrhosis.

The writer's observations are in confirmation of Nauwerck's view. His conclusions are that in the liver cell there are two systems for carrying away the secretions of that organ: 1, the bile system; 2, the glycogen system. They do not communicate. The latter begins as a fine basket-like network close about the nucleus, running in all directions throughout the cell, finally emptying into the blood capillaries. The bile system consists of larger vessels in communication with the so-called Kupffer's secreting vacuoles, and connecting with the intercellular bile capillaries. To demonstrate these he used various methods of hardening and staining. In case of a biliary obstruction there is pressure on the cells from the canals both within and without. This causes a degeneration of the cell and a deposit of pigment, which he describes in detail. The obstructed bile is then diffused throughout the cell and carried away into the blood by the unobstructed glycogen canals.

On the Histogenesis of Myomata of the Uterus.—COHEN (*Virchow's Archiv*, 1899, clviii., 524) concludes that in many cases of myoma of the uterus it is impossible to determine the origin. He distinguishes between the two following classes:

(*a*) Ordinary myomata in which occasional epithelial elements occur.

(*b*) The adenomyoma proper.

The scattered epithelial elements occurring in ordinary myomata he thinks may originate in a number of ways. Processes of the glands of the mucosa extending into the myometrium may be separated from their connection with the glands by the proliferating musculature. The myoma may develop in the region about a gland which has lost its connection with the endometrium during the intra-uterine period, and finally myomata develop in the region about a remnant of the Wolffian body.

The adenomyomata proper are those in which there is a proliferation of the epithelial elements as well as of the musculature. The adenomatous portion may originate from remains of the Wolffian body or from aberrant uterine glands displaced during embryonic or post-embryonic life. Histologically tumors of the two classes may be almost identical. He considers the following criteria the most valuable in differentiating between them: (*a*) The location (anterior or posterior wall, submucosa, intramural, susberous). (*b*) The connection of the glandular elements with the endometrium. (*c*) The simple, discrete structure of each adenomatous area when the condition is conspicuous in the whole tumor. (*d*) The presence of pigment.

It is conceivable, he says, that a leiomyoma may originate from the smooth muscles of any structure in the uterine wall. To determine the histogenesis he examined the whole of some of the smallest tumors by means of serial sections. In the central portion the muscle fibres were arranged concentrically in a ring around a small artery, so that usually no adventitia was seen, the media passing imperceptibly into the tissue of the tumor. That this relation was not secondary seemed to be indicated by the concentric arrangement and by the fact that in large tumors, where the relation to arteries was distinctly secondary, there was hyaline degeneration of the adventitia, and no direct connection between the media and the hyperplastic musculature of the tumor. In some of these small tumors, however, no histogenic relation to the arteries could be discovered.

In examining the whole of these tumors by serial sections no epithelial inclusions were found. This, he believes, demonstrates the fallacy of Ricker's hypothesis that all myomata of the uterus originate as adenomyomata.

In the normal uterus he is able to differentiate between aberrant glands originating in the endometrium and remains of the Wolffian body. The glands have the typical structure, are surrounded by "follicular" connective tissue, as in the mucosa, and they do not contain pigment. In the remnants of the Wolffian body, on the other hand, the connective tissue is spindle-celled, and in the epithelial cells and lumina of the glands may be demonstrated an iron-containing pigment.

In two of his cases, where the adenomatous elements seemed clearly to have originated from the mucous membrane, the structure was almost identical with that described by v. Recklinghausen as characteristic of the tumors originating from remains of the Wolffian body. The pseudoglomeruli only were missing.

Cohen has made an important observation in regard to the pigment contained in the adenomyomata apparently originating from the Wolffian body. With few exceptions he finds that it always contains iron. The pigment in the normal remnants of the Wolffian body, especially the organ of Giraldis, in every case examined failed to respond to the tests for iron. He calls attention to the bearing of these facts upon v. Recklinghausen's suggestion of an homology between the pigments in these two situations.

[One might consider the fact that some adenomyomata, apparently originating from the mucosa of the uterus, have the structure described as characteristic of those arising from remnants of the Wolffian body, as evidence that the posterior part of the Müllerian duct originates in the anamnia by a division of the Wolffian duct. If this were the case it is conceivable that some of the tubules of the Wolffian body might be connected with that portion of the Wolffian duct which gives origin to the Müllerian duct. Retaining this connection as the Müllerian ducts fuse to form the uterus, they might give origin in adult life to an adenomyoma apparently taking its origin from the mucous membrane. At any rate, it is not remarkable that structures so closely associated in their origin should tend to approach each other in their adult form.—Ed.]

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

CHARLES HARRINGTON, M.D.,
ASSISTANT PROFESSOR OF HYGIENE, HARVARD MEDICAL SCHOOL,

AND

EDWARD F. WILLOUGHBY, M.D.,
OF LONDON.

The Use of Coloring Matters in Tracing Pollution of Water Supplies.—A comparative study of the efficiency of various coloring matters in tracing the flow of polluting influences has been made by A. Trillat (*Annales de l'Institut Pasteur*, 1899, v. p. 444), who was called upon to investigate a case in which he proved that a conduit was carrying other water than that for which it was intended. The coloring agents studied included eosin, auramin, acid fuchsin, safranin, methylene-blue, fluorescin, and others. Lime salts in water affect most of these by decolorizing them or throwing them out of solution. Those least affected are safranin, methylene-blue, and fluorescin. The intensity of the coloration of the several agents varies greatly, not only with the nature of the water, but still more with the nature of the soil. Clay and sand allow all the colors to pass freely; humus and garden soil will pass only acid fuchsin and fluorescin, while peat decolorizes all, even fluorescin. Dissolved in water in the proportion of one part in fifty millions the several agents give different degrees of intensity of color in the following order: fluorescin, malachite-green, methylene-blue, violet, neutral fuchsin, safranin, congo-red. As fluorescin is more readily seen when very dilute solutions are examined against a black background, he devised a "fluoroscope" consisting of two tubes of white glass attached vertically to a stand by means of clamps. The tubes are 1.2 metres long, and 2 cm. in diameter. They are open at the top, and closed at the bottom with blackened stoppers. The depth of color is determined by looking downward at the black stopper through a column of water 1.2 metres in height, the other tube being filled with water containing no added substance. By means of this apparatus the ordinary visibility of fluorescin is increased to such an extent that one part can be seen when diluted with two billion parts of water. In many cases it is quite enough to add a small amount, say 100 grammes, of fluorescin to the water whose course is to be traced. A kilogramme suffices to impart color to the enormous bulk of 2,000,000 cubic metres.

Meat Poisoning.—In none of the numerous cases of meat poisoning hitherto investigated bacteriologically has the proteus vulgaris been definitely determined to be the exciting cause, although in several instances it has been under suspicion. The first case in which the evidence appears to be in any way conclusive is one reported by S. GLÜCKSMANN (*Centralblatt für Bäkteriologie*, xxv. p. 696). The offending meat was from a pig slaughtered on account of sickness. It was pickled for four days, and then smoked for three more and placed on sale. Those who ate the cooked meat suffered no inconvenience, but two persons, father and son, who ate a small piece in the raw state, were seized with gastro-enteritis, and the father died. Examination of the victim's organs yielded no satisfactory results. Proteus vulgaris was found in the meat and in the stomach contents. Bouillon cultures injected into mice and guinea-pigs proved to be very virulent. Glücksmann suggests that the bacillus may have been the cause of the sickness of the pig, or that the meat became contaminated by it after the slaughtering and during its treatment. In either case it is evident that neither pickling nor smoking was sufficient to interfere with the vitality of the organism.

Another outbreak of an unusual character in which no fatalities occurred is reported by DR. W. N. BARKER (*British Medical Journal*, November 11, 1899). Here the meat was canned corned-beef, which presented no unusual appearance other than that it was less firm than commonly is the case, and that the jelly was rather oily. It had no odor, and its taste was not disagreeable excepting to one of the twenty-four persons who shared it. All who ate were affected. Their ages ran from two to eighty-nine years, and about half were under twelve. The main symptoms were the same in all, but each case presented symptoms peculiar to itself. The following will serve as a type of the whole number: A woman ate about two ounces of the meat, and in two hours was seized with sudden faintness, dizziness, and drowsiness, followed by nausea and great muscular weakness, most marked in the legs. Vomiting and retching soon set in, accompanied by intense frontal headache, and followed by colic and diarrhœa. An hour after the onset she was removed to the hospital, where, when first seen, she was lying in a state of extreme collapse with her knees drawn up. The skin was cold and clammy, the pulse small and rapid, respiration shallow, pupils dilated, and temperature subnormal. Her stomach was washed out, and this treatment was soon followed by improvement. The pulse became stronger, pain and retching ceased, drowsiness became less marked, and only the headache and diarrhœa remained. In about an hour the condition of collapse and other symptoms reappeared, but in less marked degree than before. The stomach was again washed out, and this time with permanent good effect. She slept well, and on the following morning all the symptoms, except slight frontal headache, had disappeared.

Bacteria in the Arctic Regions.—Some interesting facts concerning the freedom of the air, water, and even the intestinal contents of animals of Arctic regions from bacteria are communicated by DR. LEVIN, of Stockholm (*Annales de l'Institut Pasteur*, July, 1899, p. 558), who took part in the Natthorst expedition during the summer of 1898. Working each time with 20,000 litres of air, he found practically no bacteria. Sea water, snow, and ice yielded on an average one bacterium per 11 c.c. In twelve samples of brown mud he found only a single bacterium. The intestinal contents of polar bears, seals, eider ducks, and other birds, sharks, sea urchins, anemones, and crabs were nearly always sterile. Not only did he obtain no growths, but he was unable to find evidence of the presence of bacteria after staining the intestinal contents with the usual agents. These results confirm the conclusions of Nencki, Nuttall and Thierfelder concerning the presence of bacteria as a non-essential factor in digestion.

Toxalbumin in the Flesh of Eels.—The discovery by Mosso of a toxalbumin in the blood of certain eels led E. BENECH (*Comptes-rendus*, 1899, cxxviii. p. 833) to investigate the question whether such exists also in the flesh. The minced flesh completely freed from blood was extracted with cold water. The residue contained nothing poisonous, but the watery extract yielded a toxalbumin which in doses of 0.02 per kilogramme proved fatal to rabbits. The substance is very susceptible to heat. At 86° F. the solution became turbid; at 104° it loses its toxic quality, and at 131° it is precipitated.

Typhoid Bacilli in Drinking Water.—A positive result, said to be the first instance in which the isolated typhoid organism responded to every test, including growth on gelatin, potato, litmus milk, bouillon and glucose bouillon, agglutination, and Pfeiffer's test with animals, has been reported by DRS. KÜBLER and NEUFELD (*Zeitschrift für Hygiene und Infectionskrankheiten*, 1899, xxxi. p. 133). The contamination of the well, the water of which had caused a small local outbreak, was traced to the urine of a typhoid patient whose vessel was emptied near the well. That the contamination was not of fecal origin was evident from the absence of the colon bacillus. Four weeks from the time of the discovery of the organism a second examination was made. On this occasion bacilli were found which responded to all the tests except Pfeiffer's, which exception was attributed to modified virulence.

Typhoid Fever from Infected Vegetables.—The State Board of Health of Massachusetts has conducted an investigation of an outbreak of typhoid fever in a public institution, a hospital for the insane, at Northampton, Mass., and demonstrated that the disease was spread by celery raised on the premises. On September 10, 1899, after practical immunity for ten years, cases began to be reported, and in fifteen days thirty-nine cases occurred. It was discovered that while patients, nurses, and servants were attacked the non-paying patients were exempt. Both classes of patients received practically the same kind of food, but the paying patients had occasional allowances of extras, like fruit and certain vegetables, and at this time had been receiving celery raised in beds which were watered with filtered sewage. This had been given out not only to the paying patients, but to the nurses and farm hands as well. After the blame was placed and orders issued that no more of the celery should be used, one of the farm hands ate some, and within ten days came down with the disease. As soon as its use was discontinued the number of cases began to diminish.

Another outbreak of a similar character was reported by Dr. Ferre (*Annales d'Hygiene Publique et de Médicine Legale*, January, 1899, p. 23) by whom it was investigated. This was in a girls' school at Jurancon (Basses-Pyrénees) which was attended by day scholars as well as by boarders. The drinking-water was exonerated, and the food supply inculpated by the fact that, while both classes used the water, only the boarders were seized. It was shown that the vegetable garden which supplied the school was watered with the contents of the cesspool which received the evacuations of all.

Transmission of Infection by Flies.—An interesting experiment illustrative of the possibility of transmission of infection through the agency of flies is communicated by Dr. F. Smith, of Sierra Leone (*Public Health*, December, 1898). Four Petri dishes were prepared, three with sterile, coagulated serum, and one with a culture of diphtheria on serum. A common house-fly was made to walk first over a sterile dish (No. 1), then over the one on which was the growth of diphtheria (No. 2), and next over the other two sterile ones (Nos. 3 and 4). Numbers 1, 3, and 4 were then placed in an incubator On the following day No. 1 showed only a few cocci, but Nos. 3 and 4 showed colonies of diphtheria bacilli in the tracks of the fly.

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are received only *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

Dr. Alfred Stengel, 1811 Spruce Street, Philadelphia, U. S. A.
Or
Dr. Hector Mackenzie, 59 Welbeck St., Cavendish Sq., London, W., Eng.

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

MAY, 1900.

AN ANALYSIS OF FIFTY-ONE CASES OF PNEUMOTHORAX.

By John Lovett Morse, A.M., M.D.,
ASSISTANT VISITING PHYSICIAN AT THE CITY HOSPITAL, AND ASSISTANT PHYSICIAN AT THE INFANTS' HOSPITAL, BOSTON; ASSISTANT IN CLINICAL MEDICINE AT THE HARVARD MEDICAL SCHOOL.

Frequency. During the eighteen years from 1882 to 1899, inclusive, the diagnosis of pneumothorax appears sixty-four times in the medical records of the Boston City Hospital. In thirteen, however, the data are not sufficient to confirm the diagnosis, so that but fifty-one are available for study.

Etiology. Seven, or 14 per cent., were certainly not tubercular. In 8, or 16 per cent., no cause for the pneumothorax could be made out. As the conditions, besides tuberculosis, causing pneumothorax are usually evident, and as pneumothorax may occur early in the course of tuberculosis and before the development of other well-marked symptoms, it is probable that these cases were also tubercular. They will, therefore, be classified as such. In the remaining 36, or 70 per cent., there can be little or no doubt as to the tubercular origin. Unfortunately, autopsies were obtained in but few cases, and routine examinations of the sputum for tubercle bacilli were not the custom in the earlier years. The diagnosis of tuberculosis was proved by autopsy in 13 cases, and by the demonstration of tubercle bacilli in the sputum in 2 more. In the others it rests on the presence of the physical signs of tuberculosis in the other lung and histories typical of pulmonary tuberculosis. Physical signs were present in all but 3 cases. The proportion

---

[1] Read at a meeting of the Clinical Section of the Suffolk District Medical Society, February 21, 1900.

of tubercular cases was therefore 86 per cent., or, omitting the cases open to some doubt, 70 per cent. These figures correspond very closely to those obtained in other series of cases.

NON-TUBERCULAR CASES. One of these was due to trauma, and in one the cause was undetermined, except that the fluid gave a pure culture of streptococci. Four followed pneumonia and abscess of the lung, and one gangrene of the lung.

Trauma. This case was due to a stab with a pen-knife. It was open, purulent, and was treated by excision, irrigation, and drainage. Recovery was complete four months after operation.

Unknown Cause. The pneumothorax was present when first seen, five weeks after the beginning of some acute illness. The onset of the pneumothorax was insidious. It was open and purulent. Excision was followed by death on the same day. Smears and cultures showed streptococci and no tubercle bacilli. There were no tubercle bacilli in the sputum.

Pneumonia and Abscess of the Lung. The onset gave no symptoms in any. The physical signs of pneumothorax were discovered on the seventh, fourteenth, and twenty-sixth day after the beginning of the pneumonia. All were open and purulent. One was not operated on, and died on the fourth day after the onset of the pneumothorax. Excision was done in three, and all recovered.

Gangrene of the Lung. The pneumothorax came on acutely one month after the beginning of an acute illness following immersion. There was no operation, and death occurred on the fourth day of the pneumothorax. The pneumothorax was open. Autopsy showed gangrene of the lung and perforation, but no evidences of tuberculosis.

Conclusions. These cases are too few to warrant any definite conclusions. It does seem evident, however, that when the pneumothorax is secondary to non-tubercular pulmonary diseases it is likely to remain open, and is always purulent. The results of excision of the ribs when it is due to the perforation of a pulmonary abscess are very encouraging. The onset in these cases is very often unnoticed, probably because of the serious condition of the patient as the result of the primary disease.

TUBERCULAR CASES. *Heredity.* There was a well-marked tubercular history in 13, or 30 per cent. No history was obtained in 8. It was good in 23, or 52 per cent.

Sex. Thirty-seven were men and 7 women. This preponderance of the male sex has been the rule in other series.

Age. The average age in 36 men was twenty-eight years, and in 7 women twenty-six years. The youngest man was seventeen, the oldest fifty-eight. The youngest woman was nineteen, the oldest forty-four. Twenty-three, or 53 per cent., were in the third decade. This frequency in the third decade has been noted in other series, and is probably explained by the fact that the mortality of tuberculosis is greatest at this period. Four men and one woman were over forty, the respective ages being fifty-eight, fifty-six, forty-four, forty-one, and forty-four. This is an unusual proportion of older people, as the condition is said to be very uncommon over forty.

Location. The pneumothorax was on the right side in 15 cases, and on the left in 29. Both sides were never involved. This preponderance of the left side has been observed in most series of cases. Some of the explanations given for this preponderance are that the left lung is more often tubercular than the right, and that the greater mobility of the anterior border of the left lung, because of its position over the heart, renders the formation of adhesions difficult, and hence predisposes to perforation. Neither of these explanations seems very satisfactory, however.

Onset. The onset of the pneumothorax was accompanied by acute symptoms in 17, or 44 per cent., of the 39 cases in which there were any data. In the remaining 22 the onset was insidious.

In one case with well-defined onset it came on after a hard fit of coughing, in another while anchoring in a tug of war, and in another as the result of being thrown while wrestling. In one case it was especially noted that he collapsed without cause, in another that he was quiet at the time, and in another that there was no exertion or cough. Another woke up in the night with pain and dyspnœa.

The symptoms of the onset in 11 cases were *sudden* pain with dyspnœa or orthopnœa. In 4 cases there was sudden dyspnœa or orthopnœa without pain. Two cases were ushered in with pain, but did not have dyspnœa for some hours. Collapse was noted in 1 case, a chill in 1, vomiting in another, and sudden " weakness " in 2.

The pneumothorax came on insidiously in 7 of the cases while they were in the hospital. There was no increase in the symptoms, and the presence of the pneumothorax was not suspected, being in all cases discovered in the routine examination of the chest. Two were under treatment for pulmonary tuberculosis. Four had pleurisy with serous and 2 with purulent effusion. All had been tapped before the occurrence of the pneumothorax. Owing to the insidious onset it is impossible to state what connection, if any, there was between the tapping and the pneumothorax.

The onset of the pneumothorax was the first symptom of disease in 4 cases. Other symptoms, more or less marked, of pulmonary disease preceded the pneumothorax in 35 others. The duration of these symptoms varied from a month to four years; the average was a little more than eight months.

Physical Signs. The hospital records were, as a rule, so incomplete that it was impossible to draw any very definite conclusions from them.

In the 38 cases in which there was fluid as well as air in the pleural cavity succussion was noted in 24, and a metallic tinkle in 17. It is probable that both were present, although not noted in most if not all of the others.

The physical signs pointed to an open pneumothorax in 16 cases, to a closed one in 18 cases, and to a valvular one in 5 cases. No conclusions could be drawn in the others.

As would be expected, the displacement of the heart and liver in the closed and valvular cases was somewhat greater than in the open, and was greater in the left-sided cases than in the right. The heart was displaced in every case but one. Firm pericardial and pleuro-pericardial adhesions accounted for the absence of displacement in this case. The data do not warrant any more definite conclusions.

In 10 of the cases the physical signs of expanded lung were present at the apex on the affected side. The explanation, as proved by autopsy in 4 cases, is undoubtedly the adherence of the pleural layers. Fluoroscopic examination in another case showed the lung expanded at the apex above the air and fluid.

In 6 of the cases there was no fluid in the pleural cavity. In 5 with fluid there were no data as to its character. In 14 it was serous, and in 19 purulent. That it may remain serous is proved by two cases in which it was unchanged after six and nine months.

Mortality. Seven of the 43 cases in which the data were satisfactory recovered from the pneumothorax—*i. e.*, 16 per cent. The duration of the pneumothorax in these cases was three weeks in 1, four weeks in 1, five weeks in 1, six weeks in 3, and four months in 1. Physical examination showed complete expansion of the lung in 1 case four weeks, and in another five weeks after the onset. Autopsies, in one case after two months and in another after five months, showed complete expansion of the lung with the layers of the pleura adherent throughout their whole extent. It is probable that this is the condition in most of the cases which recover. Two died in three months, 1 in eight months, and 1 in four years. One was alive at the end of six weeks, another at the end of nine months, and a third at the end of ten months, when they passed from observation. It is evident, therefore, that even in cases which recover from pneumothorax death is likely to ensue early as the result of the causative conditions.

The pneumothorax is known to have continued until death in 27 cases. In 24 of them death occurred at intervals of from two days to four months after the onset, 9 being in the first two weeks. Two lived eighteen months, and 1 died as the result of an Estlander operation seven years later, the pneumothorax having persisted. The fatal termination in this case can hardly be attributed to the pneumothorax.

Nine cases passed from under observation at intervals of from two days to two months after the onset of the pneumothorax. Two of these died in two months, 1 after eighteen months, 1 after twenty-one months, 1 after three years, 1 after five years, 1 after eight years, and 1 after eleven years. One was lost sight of, and the other is known to be alive after eight months. The death of the first two can certainly be attributed to the pneumothorax.

Twenty-six, or 60 per cent., of 43 cases died, therefore, directly as the result of the pneumothorax. One is still alive, and 6 probably died as the result of the causative processes rather than of the pneumothorax. This percentage of direct mortality is rather lower than that of most observers. Thirty, or 79 per cent., of the 38 cases in which the data are complete died in less than a year, and only 4, or 10 per cent., were alive after five years. Death was sudden in four instances. This liability to sudden death should always be remembered in the prognosis of these cases.

All the cases that recovered and all that passed from observation alive were left-sided. Of those in which the pneumothorax persisted until death 15 were right-sided and 12 left-sided. Left-sided pneumothorax was less fatal, therefore, than right-sided. It is very possible, however, that this difference is purely accidental.

Six of the seven women died in the hospital, the other three months after leaving it. The condition seems, therefore, to be more fatal in women than in men. This has been the case in other series.

Pathological Lesions. Cavities were found in 8 of 10 autopsies in which the point was noted. In 6 the cavity was at the apex of the lung, in 1 in the lower lobe. The perforation was found in 6, and was, as a rule, very small. In 3 cases a piece of fibrin acted as a valve.

It seems worth while to compare the course and ultimate results of the cases in which the pneumothorax remained uncomplicated with those in the cases in which serum or pus was also present.

Air Cases. There were 6 of these cases; 5 died in a week or less. The other showed no fluid at the end of a month. It died in twenty-one months. The absence of fluid in the 5 cases that died in the first week may be accounted for by the early death, fluid not having had time to accumulate. It is possible that the other case may have always remained gaseous, as it was so at the end of a month. It is more probable that fluid formed later. Several cases have been reported, however, in which liquid never appeared and which recovered rapidly. Such cases must be very rare, however, as the absence of exudation means a normal pleura, which is unusual in tubercular cases. If the pleura is normal and the lung but little diseased, there seems no reason why they should not run a favorable course as do cases due to external causes or rupture from violence.

Serous Cases. There were 14 of these cases. Six of them were among the cases in which the pneumothorax was recovered from. It is probable that some of the others became purulent after they passed from observation. One was still serous at the end of eight months, however, and another at the end of nine months.

Six, or 43 per cent., died in the first three months. Three passed from observation at the end of six weeks, nine months and ten months. One is still alive at the end of 8 months. One lived eight months ; 1, four years ; 1, eight years ; and 1, eleven years.

The proportion of cases in this series which recovered from the pneumothorax is unusually large, but few cases having been reported.

Purulent Cases. There were 19 purulent cases. The pneumothorax disappeared in only one of them. The lung did not expand, however, and the empyema increased. Death took place at the end of two months.

Twelve, or 63 per cent., died in the first three months ; 1 lived four months ; 1, five months ; 3, eighteen months ; 1, five years ; and 1, seven years.

Four cases were operated on. Two died three weeks after excision ; 1 lived eighteen months after an excision. The sinus remained open until death. Another lived seven years after an incision, followed later by an excision. The sinus remained open and the lung did not expand. He died about a week after an Estlander operation. Although surgical interference did not give very favorable results in these cases, yet it is noticeable that the case that lived longest was operative. He would undoubtedly have lived longer had it not been for the last operation. Another of the longer cases was also operative. The results under medical treatment were certainly no better, if as good. There was, moreover, no evident tendency toward closure of the perforation and expansion of the lung under expectant treatment. Hence in cases in which the pulmonary lesions are not too far advanced surgical intervention along the same lines and under the same conditions as in tubercular empyema seems indicated.

Comparison of Serous and Purulent Cases. Comparing the serous and purulent cases it is evident that the prognosis both as to recovery from the pneumothorax and as to duration of life is much more favorable in the serous cases. Recovery from the pneumothorax occurred in 6 of the serous cases and in only one of the purulent. There was no absorption of the fluid in this case, while in the serous cases the fluid also disappeared. Moreover, only 43 per cent. of the serous cases died in the first three months to 63 per cent. of the others. The duration of life in those that lived more than three months was so variable in both classes that comparison is impossible.

Subjective Symptoms. A very noticeable thing in the histories of these cases was the great difference in the subjective symptoms under apparently similar conditions. Many of the cases had marked dyspnœa or orthopnœa and were extremely uncomfortable, while others were up and about the ward within two or three weeks of the onset, with their chests full of air and fluid. One man was able to "bundle wood" without much discomfort after five months.

Conclusions. Pneumothorax is an uncommon condition. At least 70 per cent., and probably 85 per cent., of the cases of pneumothorax are tubercular. The prognosis is good when it is due to trauma. It is fair when the pneumothorax is secondary to abscess of the lung. The results of excision of the ribs in these cases are very encouraging. Tubercular pneumothorax is much more common in men than in women. It is most frequent in the third decade. It is about twice as frequent on the left as on the right side. The onset is acute in rather less than half the cases. Sudden pain with dyspnœa are the most common initial symptoms. The pneumothorax may be the first symptom of tuberculosis noted. Displacement of the heart always occurs, being more marked in the left-sided cases. The pneumothorax is usually complicated by the presence of fluid, but may be simple. Air is rarely present alone in cases living more than a week. The fluid is more often purulent than serous. Recovery from the pneumothorax may occur in about 15 per cent. of all cases. The cases which recover are practically all serous. They usually die later, however, from pulmonary tuberculosis. The pneumothorax is the direct cause of death in 60 per cent. Eighty per cent. of all cases die in less than a year, and only 10 per cent. live over five years. The prognosis is worse in right-sided than in left-sided and in purulent than in serous pneumothorax. It is worse in women than in men. Surgical intervention is at least worthy of consideration in the purulent cases. Patients with pneumothorax are sometimes able to be up and about and even to do manual labor.

THE ACUTE PNEUMONIC FORM OF TUBERCULOSIS.

By Arthur W. Elting, M.D.,
THE BENDER HYGIENIC LABORATORY, ALBANY, N. Y.
LATE RESIDENT HOUSE OFFICER, THE JOHNS HOPKINS HOSPITAL, BALTIMORE, MD.

The gelatinous tuberculous infiltration was first described by Laennec. He did not, however, recognize its marked resemblance to acute lobar pneumonia.

Louis saw cases of acute pneumonic phthisis, but considered them to be cases of tuberculosis complicated with genuine croupous pneumonia.

Andral[1] believed that tuberculosis, in some cases, followed pneumonia, taking its origin from some tuberculous focus in the lung, while in other cases the pneumonia in a lung previously sound and healthy was followed by tuberculosis; but that in each case the pneumonia was at first of a genuine croupous character.

Stokes[2] divided acute tuberculosis into three groups:

1. A form characterized by a diffuse bronchitis with dyspnœa, cyanosis, high fever, and a typhoid state; a form identical with acute miliary tuberculosis.

2. A form resembling pneumonia and characterized by diffuse crepitant râles, corresponding to the acute caseous pneumonia.

3. The hæmoptic form; a more circumscribed form of acute tuberculous bronchopneumonia.

In the first and second forms the course is rapid and without signs of ulceration. In the third form the course is slower and ulceration may appear.

Traube[3] was the first German writer to describe the acute pneumonic form of tuberculosis, and in his first publication on this subject he called attention to the green sputum seen in these cases. It closely resembled pneumonic sputum, except that it was of a more greenish hue.

In a later article Traube[4] distinguished two general types of sputum seen in acute pneumonic phthisis. In the one it was reddish, yellow, or green, while in the other it was decidedly bloody, and the latter form usually appeared earlier in the disease. He laid especial emphasis upon the fact that the disease but seldom begins with a chill.

Hager[5] has given an excellent description of the condition, and he remarks that an acute miliary tuberculosis complicated with acute, lobular, desquamative pneumonia can be easily mistaken for croupous pneumonia. Hager believes that the pneumonia is not due to the local irritation of the tubercles, but represents an acute inflammatory process which like the tubercles is caused by the tuberculous poison.

Riel has reported fifteen cases of acute pneumonic phthisis, part of them collected from the literature. Twelve were adult men, two were women, and one was a child.

Frankel and Troje[7] report thirteen cases, all in men. In more than half of these cases reported by Frankel and Troje, neither the shape of the thorax nor the condition of nutrition indicated in the least the existence of a tuberculous lung affection; on the contrary, many of the subjects were robust, hard-working men, and some had never been ill before. Only three of the thirteen were addicted to alcohol. Only one had an hereditary history of tuberculosis, and one had had a resection of an elbow-joint several years previously. In eleven cases the age was between twenty and forty years. One patient was fifty-three years of age and one was seventy-two years of age. All observers are agreed that in contradistinction to true croupous pneumonia the disease seldom begins with a chill, but the onset is of a more insidious character.

When chilly feelings occur at the onset they are of a recurrent character. Four of the thirteen cases reported by Frankel and Troje began acutely with a chill. In the majority of the cases the fever was of a more or less pronounced remittent character; at times even of an intermittent type, with normal or subnormal morning and high evening temperature. This peculiarity of the temperature-range is a most significant feature of the disease. Two of the thirteen cases had well-marked herpes labialis. The pulse ranged from 100 to 140. The absence of cyanosis and dyspnœa were notable features in all the cases. The physical signs in the cases reported by Frankel and Troje were those of infiltration of an entire lobe or the greater part of a lobe, and resembled those noted in a lung just past the crisis or resolving in croupous pneumonia. In addition to loud tubular breathing, widespread crepitant, subcrepitant, and small moist râles were heard. The infiltration usually involved the posterior portion of one lung, sometimes the lower lobes alone. This was probably due to the fact that one had to do with an aspiration pneumonia. Usually only one lung was affected, and that was the one which contained the old focus. Frankel and Troje state that though the tuberculous process almost invariably takes its origin from an old focus of tuberculosis it is only in a very small number of cases that this focus can be demonstrated *intra vitam*.

These authors also lay especial emphasis upon the fact that there are frequent changes in the percussion note and the auscultatory signs. These changes seem to occur both in the cases which recover as well as in those which go on to a fatal termination. The sputum in many cases does not differ from that of ordinary croupous pneumonia. The typical rusty sputum, glairy, ropy, and transparent, naturally points to a croupous pneumonia unless, perchance, it should have a greenish tinge. Nine of the thirteen cases reported by Frankel and Troje had typical pneumonic sputum; five of these cases showed the greenish tinge described by Traube, while in four cases the sputum was typically rusty. As a rule, the pneumonic sputum lasted several weeks and gradually became of a mucopurulent character, which often showed a greenish tinge. In two cases there was hæmoptysis at the onset. In six cases tubercle bacilli were found in considerable number. In two cases the number of tubercle bacilli varied, sometimes they were very numerous, while at other times none could be demonstrated. In three cases the tubercle bacilli were not found ante-mortem, although a centrifuge was used. The earliest demonstration of the tubercle bacilli was eleven days after the onset. The inconstancy of the demonstration of the bacilli is explained by the fact that the bacilli are found in numbers only when there is softening of the lung tissue, or when the old focus from which the process took its origin is of such a character that secretion containing bacilli is poured out into the air-passages.

Liver enlargement was not noted in any of the cases, and in only two cases was the spleen enlarged. The nervous system was but slightly involved, occasional delirium of exhaustion being seen.

Albumin in the urine was rare.

Frankel and Troje consider the important diagnostic points to be as follows:

1. Absence of a crisis at the time when the auscultatory signs indicate a resolving pneumonia. The temperature may show more or less marked variations, and may at times be of the typus inversus—that is, morning temperature higher than the evening.
2. Absence of dyspnœa and cyanosis with rather rapidly increasing pallor of face and mucous membranes.
3. Greenish color of sputum and presence of tubercle bacilli in it.
4. Presence of diazo reaction in the urine from the onset.
5. Rapid emaciation and loss of strength.

Eleven of the thirteen cases reported by Frankel and Troje died.

Of the twelve cases reported by Israel[6] only three died.

Of the fifteen cases collected by Riel from the literature fourteen died.

The average duration of the cases reported by Riel was seven weeks.

In the cases reported by Frankel and Troje the minimum duration of a fatal case was twelve days, and the maximum ninety-two days, the average being about six weeks.

From their own observations Frankel and Troje conclude that the anatomical condition in acute pneumonic phthisis is that of a diffuse infiltration involving an area composed of numerous lobules, a whole lobe or even several lobes. The involved area is of a grayish-red or gray color, and the cut surface is smooth or granular. Usually the infiltrated tissue is completely airless, but sometimes in the early stages one sees a few air-containing alveoli. In the uniformly consolidated areas one often finds yellow, opaque masses of caseation which may vary greatly in form and size, at times so extensive as to occupy several lobules or the greater part of a lobe. The appearance not infrequently resembles that of Roquefort cheese. Areas of softening are rare, and when cavities are formed the walls are not indurated.

The constant fashion in which the histological findings in the diffuse gelatinous infiltration differ from those seen in areas of tuberculous proliferation of tissue lead Frankel and Troje to assume that the diffuse gelatinous infiltration is not the direct result of the action of the tubercle bacilli, but of their diffusible chemical products.

These authors have performed a series of experiments upon rabbits in which they made intratracheal injections of cultures of tubercle bacilli and succeeded in producing a gelatinous pneumonia, without the presence of any other micro-organisms than tubercle bacilli.

This view, that the inflammation may be in great part due to the toxins, is strengthened by the observation that the infiltration in some cases resolves, which would not be expected if the tubercle bacilli were present in any number.

Frankel and Troje state that the areas of caseation are always surrounded by a zone of epithelioid tissue, and they assume that caseation occurs only in this epitheloid tissue and not in the exudative contents of the alveoli.

In this zone of epithelioid tissue as well as in the periphery of caseous masses one usually finds tubercle bacilli. The epithelioid growth takes its origin from the alveolar walls, and the growth is usually intra-alveolar, in contradistinction to the condition in miliary tuberculosis where the tubercles usually develop interalveolarly. The principal feature of the gelatinous infiltration is an exudative inflammatory process with marked proliferation of the alveolar epithelium and desquamation of the same.

In the service of Dr. Osler at the Johns Hopkins Hospital there occurred a case of acute pneumonic tuberculosis in which the diagnosis was confirmed at autopsy. So many interesting features of the disease were illustrated by this case that it was thought best to report both the clinical and pathological notes somewhat in detail.

E. H., female, married, aged thirty-eight years. Admitted August 16, 1898; died September 21, 1898.

Complaint. "Stomach trouble."

Family History. Good. No tuberculosis, cancer, or heart disease.

Personal History. Usual diseases of childhood. Malaria off and on for the past eighteen years, usually in the fall, at times followed by more or less of malarial cachexia.

Present illness dated from May, 1897. Pain in the region of the stomach after eating. No nausea or vomiting at first. Since April, 1898, stomach symptoms have been more aggravated, associated with nausea and vomiting. Slight hæmatemesis at times. No cough or shortness of breath. Has lost thirty-four pounds in weight during the past year.

Physical Examination. A somewhat emaciated woman; dorsal decubitus; comfortable. Skin dark and sallow, slightly pigmented; lips and mucous membrane somewhat pale; pupils moderately dilated, equal, react to light and accommodation; tongue pale, slight moist white coat; pulse 76 to the minute, regular in rate and rhythm, moderate tension and small volume; artery can be rolled under finger.

Thorax well formed and symmetrical. Right clavicle a trifle more prominent than the left. Costal angle about 90°. Expansion slightly greater on the right than on the left side. Vocal fremitus felt on both sides, more plainly on the right. The percussion note clear and resonant throughout both fronts and axillæ. On auscultation breath sounds clear and of normal relative intensity, no râles or adventitious sounds.

Backs. Vocal fremitus felt on both sides, more plainly on the right. Percussion-note clear and resonant throughout both backs. On auscultation breath sounds clear and of normal relative intensity; no râles or adventitious sounds.

Heart. Negative.

Abdomen. Liver dulness not increased. Spleen just palpable at costal margin on deep inspiration. Right kidney palpable. No glandular enlargement. No swelling of feet or ankles. Urine examination negative.

August 17*th.* Stomach inflated; lower margin extends to the level of the umbilicus; greatest extent of stomach tympany 24 cm.; no peristaltic waves; no mass felt.

Vaginal examination negative.

At 10 P.M. stomach washed; small amount of partly digested food; fluid faintly blood-tinged.

18*th. Test-breakfast.* Slice of bread, water four ounces, removed after one hour; 25 c.cm. obtained; partly digested food, no blood, sour odor, acid to litmus, no free hydrochloric acid. Suggestive reaction for lactic acid with Uffelmann's test. Total acidity: 1.4 c.cm. of decinormal sodium hydrate solution required to neutralize 10 c.cm. of filtered gastric juice. Rennin present; pepsin present. As a result of this examination the possibility of carcinoma of the stomach was considered. Temperature since admissio n98° to 100°. Patient has seemed to be doing well.

23*d.* No pain, no cough, no chill, simply general malaise. Dulness in right back at extreme base. Superficial dry friction rub, heard all over the lower right back, while at the base respiration has a distinctly tubular character. The tubular respiration does not extend above the angle of the scapula nor forward of the scapular line. Temperature to-day ranged from 99° to 100.8°. Leucocytes 6000 per cubic millimetre. Fresh blood examination negative. Urine examination negative.

25*th.* Area of dulness and tubular breathing in right back seems to have increased; extends now to midway between the angle and spine of the scapula. Few superficial crackles heard at the end of deep inspiration. Area of dulness does not extend anteriorly beyond posterior axillary line. Right front and axilla and left lung clear on percussion and auscultation. Small amount of rusty sputum. Slight cough, no dyspnœa, no cyanosis. Respirations 18 to 24 per minute. Temperature for the past two days has ranged from 99.6° to 101.4°. Leucocytes 6100 per cubic millimetre.

27*th.* Dulness below spine of scapula inside of mid-scapular line. Respiration blowing and tubular, not very intense. Fine crepitant râles are much less numerous than previously. For the past two days the temperature has ranged from 102.2° to 103.8°. Respiration 24 to 30. No cyanosis. Patient weaker. Small amount of rusty sputum. Leucocytes 5200 per cubic millimetre.

29*th.* Patient dull and drowsy this morning. No respiratory distress, no cyanosis. Dulness extends to the spine of the scapula in the right back and as far as the sixth rib in the mid-axilla; does not pass anterior axillary line. Over this area tubular respiration is heard, especially intense in the lower right back. A few small moist râles on deep inspiration. Temperature has ranged from 100.2° to 104.8°. Respiration 24 to 28. Pulse 108 to 126 and rather weak. Leucocytes 5200 per cubic millimetre. Sputum fluid and typically rusty. After very careful examination a few typical tubercle bacilli were found in the sputum associated with numerous streptococci and diplococci. No elastic tissue.

31*st*. Patient decidedly weaker. Pulmonary signs unchanged. Pulse small, 116 to the minute, low tension, and occasionally intermittent. Temperature still elevated, ranging from 99° to 104°. During the past twenty-four hours the patient has had several hæmoptyses of bright red blood from one to three ounces at a time. No respiratory or cardiac distress.

September 5th. Pulmonary condition has remained unchanged since last note. Temperature has ranged from 102° to 104°. Pulse weak. No cyanosis, no respiratory distress. Some cough. Expectoration not very profuse, bloody. Patient seems to be growing weaker. Slight abdominal distention.

13*th*. Patient very weak. Temperature ranging from 100° to 103.8°. Respiration 20 to 28. Over right axilla note is almost tympanitic in quality; duller over the back. Breath sounds tubular, almost amphoric. Occasional râle on expiration. Right front clear. A few scattered fine râles heard over the left side. Examination unsatisfactory because of very weak condition of the patient. Leucocytes 3400 per cubic millimetre. Repeated sputum examinations have on each occasion shown a few typical tubercle bacilli. No elastic tissue demonstrated.

21*st*. Patient has gradually grown weaker. Temperature has still remained elevated. Slightly delirious at times. No respiratory distress. Physical examination not attempted. Death was quiet, at 10.15 P.M. on the thirtieth day of the disease.

Pathological Report. E. H. Autopsy September 22, 1898, 11 A.M., thirteen hours after death. Heart and pericardial cavity negative.

Notes on Lungs. Dr. Osler. Right lung: old, very tough adhesions over posterior part of upper lobe and lateral and anterior surface of upper lobe. Lower and middle lobe free. Puckered depression at lateral surface of upper lobe in the same situation as the adhesions. The lung is voluminous, does not collapse. Pleura generally smooth, a little turbidity and fresh exudate over lower lobe. Color dark red except in antero-lateral margin. Upper lobe is crepitant at apex and anterior half. Middle lobe is crepitant throughout. Lower lobe universally solid.

On section upper lobe presents about its centre and corresponding to puckered area an old fibroid patch surrounding a small cavity the size of a cherry; this is in direct communication with a bronchus. The tissue outside the slaty induration is in a condition of gelatinous infiltration, and it presents also scattered small tubercles. Posterior and lower part of upper lobe is solid, and on section is seen to contain numerous groups of tubercles with solidified intervening tissue. The middle lobe is crepitant throughout, œdematous toward the root, and presents a few scattered fresh tubercles. The lower lobe is firm and airless. It feels just like a lung of red hepatization. On section uniform brownish-red in color and granular. On fresh section dry; scrapings are hemorrhagic. The reddish granular appearance with solidification gives a picture almost identical with that of ordinary pneumonia. On examination with lens it is seen that the consolidation is due to innumerable miliary granulations which are in places densely packed together; in others loosely, and with a good deal of intervening, deeply congested lung tissue. On section there are areas a little lower, indicating where there is a lower level comparatively free from tubercles. Nowhere on section are there areas showing any trace of caseation. This picture is present uniformly throughout the lower lobe. The left lung is crepitant at the apex. The lower lobe is infiltrated, only slightly crepitant. The greater part is solid. The pleura over the middle of the lung is rough, has a fresh fibrinous exudate, and a few hemorrhages. The upper lobe is much infiltrated with serum, and presents numerous areas of tuberculous bronchopneumonia and scattered groups of miliary tubercles. The apex is puckered and pigmented. The lower lobe: apex is in a condition of gelatinous infiltration. The greater part of the lobe is solid. It presents on section groups of tubercles not so closely aggregated as in the other lung. The intervening tissue is deeply congested, airless, infiltrated; sufficient to cause portions to sink. Nowhere are there any large caseous areas.

Spleen. Weight, 240 grammes, 12 x 7 x 3 cm. Capsule is smooth, bluish-red, and semi-translucent. On section consistency somewhat diminished. The spleen pulp is deep red and soft. Malpighian bodies fairly well shown.

Liver. Weight, 1470 grammes; 21 cm. broad, 18 cm. long, 8 cm. thick. Capsule generally translucent. Color of liver tissue rather pale; lobules well marked. On section epithelium cloudy, opaque, grayish-white; not in marked contrast except in a few areas where the color has a slight yellowish tinge.

Gall-bladder. Normal.

Kidneys. Combined weight, 240 grammes. Capsule quite opaque, grayish-white, strips readily, leaving a smooth, pale, pinkish-red surface with well injected bloodvessels. On section epithelium opaque, grayish-white, and somewhat swollen. Pyramids not in very marked contrast. The striæ are well shown.

Adrenals apparently normal.

Intestines. The cæcum is very hemorrhagic and congested. The follicles slightly enlarged. This appearance extends also for a short distance into the ileum. The duodenum is tremendously injected and very hemorrhagic.

Stomach contains about 100 c.cm. of sour-smelling yellowish fluid with flakes of casein, and has lost nearly all its mucous membrane, which is found adherent in strips. This doubtless is a post-mortem change. There are, however, one or two areas where the innermost lining is opaque, white, tough, and granular looking. The organ is quite dilated; many of the vessels deeply injected.

Genitalia normal.

Bladder. Walls much injected over the lower and lateral portions. Ureteral orifices patent, prominent, and pale.

Bacteriological Examination. Lungs, micrococcus lanceolatus; kidney, bacillus pyocaneus.

Anatomical Diagnosis. Acute pneumonic tuberculosis. Old tuberculous focus with small cavity in upper right lung. Fibrinous pleurisy. Chronic gastritis. Hemorrhagic duodenitis. Cloudy swelling of kidneys.

Microscopical Appearances. Lung. With the lower powers of the microscope one sees a fairly uniformly consolidated lung tissue. The exudate in places seems to be of a granular character and contains only a moderate number of cells, while in other places the cellular element seems to predominate. In still other portions of the section one sees more or less extensive areas of necrosis with caseation. The alveolar walls are plainly to be made out in all parts of the section, except where the necrosis and caseation are extensive.

On examination of the sections of the lung with the higher powers of the microscope many of the alveoli are seen to be occupied with plugs of granular and fibrillated fibrin. In this fibrinous meshwork one sees rather numerous shadows of red blood-corpuscles, together with a few swollen, desquamated alveolar cells, and an occasional mononuclear or polymorphonuclear leucocyte. In other places the fibrinous element seems to play a more subordinate rôle, while the desquamated alveolar cells form the principal element in the exudate. Nowhere, however, are there a great number of leucocytes to be seen in the exudate, and most of those present are of the mononuclear type with comparatively few of the polymorphonuclear variety. Between the two extremes of granular and fibrillated exudate containing but few cells, and an exudate composed almost exclusively of cells, one finds all gradations, the relative proportion of the different cellular elements being practically the same. The desquamated alveolar epithelial cells are the most numerous, while next in point of number come the small mononuclear leucocytes, and. lastly, the polymorphonuclear leucocytes. The red blood-corpuscles appear to be more numerous in the early stages of the process. In some of the plugs of exudate occupying the alveoli one sees distinct epithelioid cells, without, however, any evidence of necrosis. In places there seems to be a proliferation of the cells of the alveolar walls. These proliferated cells are epithelioid in character, and tend to push their way into the plugs of exudate in an attempt, as it were, to organize the exudate. It is in these masses of epithelioid cells that necrosis and caseation seem to first occur. By a gradual extension of the growth of the epithelioid cells, together with more or less numerous small round cells, several neighboring alveoli or an entire lobule may come to be occupied by this new-formed tissue. At the oldest portion of the epithelioid growth necrosis and caseation are most marked. The outline of the alveolar walls appears to be preserved for some time, but is finally lost in the mass of necrosis and caseation, the bloodvessels in the meantime having become obliterated. The process of necrosis seems to begin with a fragmentation of the nuclei. This process gradually extends until an area composed of one or more alveoli comes to be occupied by a granular mass of detritus, taking a deep eosin stain and dotted with the fragmented nuclei. Surrounding such an area of granular detritus, one can usually make out a zone of small round cells, and surrounding this a fairly distinct zone of epithelioid cells. It is through the growth with subsequent necrosis and caseation of this epithelioid zone that the more or less extensive caseous masses come to be formed.

In portions of the section fairly numerous giant-cells can be seen, situated not infrequently at or near the centre of a mass of epithelioid growth. Nowhere is there any evidence of direct caseation of the exudate. The caseation appears to always take place in and follow the epithelioid proliferation.

The walls of the bronchi appear to be involved in the same tuberculous process; the lining epithelium is for the most part destroyed. The lumen of the bronchus can often be seen to be occupied by a mass of epithelioid tissue in which necrosis and caseation are more or less marked.

The pleura is somewhat thickened and is covered with a granular necrotic material in which epithelioid cells and fragmented nuclei can be seen.

With the Weigert fibrin stain a considerable amount of fibrillated fibrin can be made out in the plugs of the exudate, especially in the early stages. The fibrin is practically absent from the areas of caseation, although it can be made out in the zone immediately surrounding the area of caseation.

Fairly numerous intracellular and extracellular cocci can be seen, many of them corresponding morphologically to the diplococcus of pneumonia.

In sections stained with carbol-fuchsin and decolorized in acid alcohol a few typical tubercle bacilli can be seen. These are generally found in the areas of necrosis and do not seem to have any definite arrangement in these areas. Occasionally a few tubercle bacilli can be seen in the plugs of exudate, and not associated with necrosis or caseation.

Liver. In addition to slight chronic passive congestion and fairly well-marked fatty infiltration, one sees numerous areas of focal necrosis of the liver cells. There appears to be nothing uniform or constant in the distribution of these focal necroses. At an early stage the focal necroses are composed of but a few liver cells in which the nuclei either do not stain at all or only very faintly. The cell protoplasm seems to have undergone a hyaline degeneration, staining very deeply in eosin. The cells often appear somewhat shrunken and are also often fragmented. The area of necrosis does not, at this stage, contain any small mononuclear or polymorphonuclear leucocytes, nor is there any evidence of a reaction on the part of the fixed tissue surrounding the area of necrosis.

At a somewhat more advanced stage one finds the area of necrosis more extensive in character and now a very few small mononuclear and polymorphonuclear leucocytes are seen scattered throughout the necrosed area. There is, however, no reaction on the part of the fixed tissue. In its most advanced stage the focal necrosis is composed of an area of hyaline degeneration of the liver cells, in which one finds fairly numerous leucocytes, chiefly of the polymorphonuclear variety. There are also a few cells of an epithelioid character, but no evidence of giant-cells. There is no evidence of thrombosis or plugging of the blood-vessels.

It was impossible to demonstrate tubercle bacilli in any of the areas of necrosis, though repeated attempts were made. Nor were any other bacteria found in the areas of necrosis.

Spleen, except for a slight increase in the number of red blood-corpuscles present, is normal.

Kidney shows fairly well-marked albuminous degeneration. The cells of the convoluted tubules are swollen, while in many places the cell outlines are lost. The nuclei in many of the cells do not stain at all, while in others they stain only faintly.

Aside from the pulmonic condition the most interesting pathological feature of this case is the occurrence of the focal necroses in the liver.

These were first described by Pilliet[8] in experimental tuberculosis of the guinea-pig. He describes the process as a coagulation necrosis, and thinks that there may be an associated interstitial hepatitis.

Kockel,[9] in experimental tuberculosis of the guinea-pig, has also described focal necroses, which he considered to be due to a plugging of the vessel. In these areas of necrosis he was able to demonstrate tubercle bacilli.

Leredde[10] has described focal necroses in the viscera in acute and subacute phthisis. These areas are invariably located about the central veins and no tubercle bacilli could be demonstrated.

Le Count[11] has described focal necroses in the liver, spleen, and lymphatic glands associated with tuberculosis. He was able to demonstrate the presence of tubercle bacilli in these areas of necrosis, and he believes them to be due to the action of the tubercle bacilli.

In our case it was impossible to demonstrate the presence of tubercle bacilli or any other bacteria in association with the focal necroses. We are, then, compelled to assume that these areas of necrosis were the result of the action of some toxin, and it would appear most probable that this toxin was one produced by the tubercle bacilli. It may, however, be objected that the presence of the pneumococcus in the lung would be sufficient to account for the focal necroses in the liver, since these have been described in association with pneumonia due to the pneumococcus. Against this may be urged the character of the focal necroses, which we have been able to study from an early stage to a somewhat advanced stage. In an advanced stage one finds numerous small round-cells and a few cells of a distinctly epithelioid character which might indicate that the focal necrosis could go on to the formation of a genuine and definite tubercle.

It is not unreasonable to assume that as a result of the action of the toxin of the tubercle bacilli there may be at first a necrosis of a few liver cells, followed later by an accumulation of small round-cells, and still later by a development of epithelioid cells, the process eventually assuming the form of a definite tubercle.

The acute pneumonic form of tuberculosis would appear to be of not infrequent occurrence, and in every case of lobar pneumonia the clinician should bear in mind the possibility of a tuberculous infection. Especially in all protracted cases of lobar pneumonia should one consider the possibility of an acute pneumonic tuberculosis. In all such cases repeated and careful examination of the sputum should be made, for only in this way can an early diagnosis of acute pneumonic tuberculosis be made.

The main clinical features of the disease are in brief:

1. Onset, very often without a definite chill, though a definite chill may occur.

2. Fever, often of an elevated, regular character, but very frequently of an irregular or remittent character, and practically always of a remittent character in the later stages

3. Absence, usually, of marked dyspnœa and cyanosis.

4. Physical signs which indicate consolidation of a part of a lobe, a whole lobe, or more than one lobe.

5. Pain in the side, with cough and a sputum which is at first typically pneumonic, rusty, and glairy, but which at the end of a week or ten days may assume a greenish tinge and which will be found to contain tubercle bacilli. In the case reported tubercle bacilli were found seven days after the onset.

6. Absence, in some cases at least, of the leucocytosis, usually associated with acute lobar pneumonia.

BIBLIOGRAPHY.

1. Andral. Clinique Medicale, 4 ed., T. ii. p. 36.
2. Stokes. Diagnosis and Treatment of Thoracic Diseases.
3. Traube. Ueber grüne Sputa. Ges. Beiträge zur Pathologie und Physiologie, Bd. ii. S. 699–711.
4. Traube. Ein Fall von acut verlaufender tuberculöser (käsiger) Pneumonie mit rasch odlichem Ausgange. Ges. Beiträge zur Path. u. Phys., Bd. ii. S. 807–814.
5. Hager. Ueber acute Miliartuberculose insbesondere zwei verlaufende Fälle derselben, unter dem klinischen Bilde einer crupösen Pneumonie. Deut. med. Woch., 1881, Nos. 40 and 41.
6. E. Israel. Den akute pseudopneumonische Lungetuberculose og dens Forholdt til den krupöse Pneumonie. Hosp. Tid. 3, R. iv. 8, 9, 10, 1886.
7. Frankel and Troje. Ueber acute Lungentuberculöse. Zeit. f. klin. Med., 1894, Bd. xxiv.
8. Pilliet. Etude zur la tuberculose experimentale et spontanée du foie. Thèse de Paris, 1892; Etude sur quelques lesions du foie dans la tuberculose experimentale du cobaye; Etude sur la tuberculose—Verneuil, Tome troisieme, 1892.
9. Kockel. Beiträge zur Histogenese des miliaren Tuberkels. Virchow Archiv, 1895, cxlii.
10. Leredde. Necroses viscerales multiples dans la tuberculose humaine aigue et subaigue. Arch. du Med. exper. et d'anat. path., 1895, vii. 87.
11. Le Count. Focal or Insular Necrosis produced by the Bacillus of Tuberculosis. Journal of Experimental Medicine, vol. ii. pp. 657–670.

SENILE BRONCHITIS.[1]

By Reynold Webb Wilcox, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL, AND PHYSICIAN TO THE HOSPITAL PHYSICIAN TO ST. MARK'S HOSPITAL.

To one conversant with the literature of medicine it appears somewhat singular that in the past so little attention has been paid to old age and its diseases, while a chair of pediatrics is now esteemed necessary in every well-ordered medical school. The graduate obtains his information concerning a most important period of life from cursory remarks bearing upon the subject made by various teachers as opportunity may, perchance, offer itself. Of systematic teaching or even of

[1] Read before the Buffalo Academy of Medicine, March 13, 1900.

exhaustive treatises upon the subject there are practically none. Yet those of us whose practice is limited to that of a physician-specialist, or, as we preferably term it, that of an internalist, find ourselves often embarrassed in the presence of some well-defined disease which in an elderly subject offers unusual symptoms and signs. While senescence and senility present a large field, any part of which might be profitably tilled, I shall call attention to a small but important portion, offering a few suggestions upon the subject of senile bronchitis. I have chosen this subject partly because of the difficulties and disappointments commonly met with in its treatment, and partly because it is so closely related to other pathological conditions in the respiratory system which is responsible for about one-third of all deaths occurring in the aged.

It is far from my purpose to occupy much time in reviewing the various theories of senility and death, for these would involve me in a discussion of a correlated mystery—life—and philosophical discussions, although attractive, are not necessary in a paper which aims to be practical; even a definition cannot now be firmly postulated. It matters not whether we agree with Cicero in his masterly *De Senectute*, that old age is a disease, and treat it and of it philosophically, or we follow Canstatt in *Die Krankheiten des Greisenalters*, of 1839, and speak of senile involution as a phase of life, and mingle, as he does, speculation and observed facts, or assent to Day in his *Diseases of Advanced Life*, of 1849, the source of much information and a mine of clinical experience, the fact remains we are dealing with ordinary phenomena of disease modified as to their manifestations by anatomical conditions peculiar to advanced life. I say " phenomena of disease " advisedly, because, while it is impossible to believe that *minus* functional activity may still further diminish and life become extinct, as the flame of a candle is extinguished as it is burnt out, yet this is the exception, and our dealings with old age rest on the assumption of its morbidity and the necessity for therapeutic interference. If old age may seem to be physiological, it is because there is certainly much truth in the saying of my old master Charcot in his *Les Maladies des Veillards*, of 1867, that the " textural changes which old age induces in the organism sometimes attain to such a point that the physiological and pathological states seem to mingle by an imperceptible transition and to be no longer sharply distinguishable," but pathological old age is markedly predominant. When does old age begin ? Hippocrates said at seventy, so did Flourens ; Canabis puts it at sixty-five ; Reveillé-Parise, at fifty-five. That the saying of Cazalis, so often quoted, " one is of the age of his arteries," is not entirely applicable is evident from the fact that a diminution in the respiratory capacity, one of the first signs of senile involution, is present as early as thirty-five or thirty-six. Doubtless the presbyatric physician, if I may be permitted to coin a term, will have his triumph in advancing the time at which senility begins, so that threescore years and ten may be relegated to the mists of tradition, and so may claim equal honor with the pediatrist who has so markedly diminished infantile mortality.

What, then, are the tissue changes of old age? They are (1) a pure atrophy of the constituent elements of the tissues; (2) a progressive infiltration into certain tissues of organic (fatty or albuminous) or mineral (calcareous) elements foreign to their normal condition; and (3) an exaggerated production of connective tissue. Practically, all of these changes are found in the contents of the chest of old subjects. Fatty degeneration of the interalveolar septa results in perforation, the capillary vessels, being thus deprived of their support, atrophy, and the blood-supply is diminished, from production of fibrous tissue, sclerosis results, calcareous degeneration of arteries is frequent, calcification of costal cartilages tends toward diminished expansibility of the chest, and this lack of mobility is enhanced by the diminished power of the muscles. Of the types of senile lung described by Hourman and Dechambre, in 1835, the second seems to me to be that of pulmonary œdema and the third of fibrosis, both manifestly dependent upon circulatory disturbances, and, therefore, secondary. Their first type is, however, worthy of our attention. "In muscular persons with a well-formed thorax, not much altered by the ravages of age, the lungs present little apparent difference from those of the adult, except in the altered position of the great interlobular fissure. The degree of this alteration corresponds with the extent of lateral flattening resulting in diminution of the transverse diameter of the chest. In the adult this fissure lies immediately beneath the upper lobe, and passes obliquely to the root of the lungs, so that on the right side the central lobe occupies exactly the middle part, and in the left side has the lower lobe immediately beneath it (the fissure). But in old age the fissure approximates to the vertical direction, so that one lobe in the left lung is directly in front and the other behind, and the middle lobe in the right lung projects downward, and the lower lobe becomes elevated behind it, so as to form the posterior fourth (or more) of the summit of the organ." The significance of this condition lies in the fact that a senile phenomena which is entirely apical may be seated in the lower lobe of either lung. The contour of the chest is quite characteristic—in its upper portion flattened at the side. The vertical diameter is shortened in consequence of the diminished height of the intervertebral cartilages, and as the anterior portion of these cartilages is more rapidly absorbed we have a forward curvature of the spinal column as a further cause tending, in conjunction with the others, to lessen the capacity of the chest. The intercostal spaces narrow until contiguous ribs come into contact with each other, and may even unite. The costal cartilages calcify and the chondrosternal articulations may unite, thus rendering the chest immobile. These facts present great significance in both symptomatology and therapeutics, as will be seen later. When, in addition, anthracosis, bronchiectasis, and degenerations of bronchial mucous membrane are generally present, the explanation of rapidity of respiration is easy. Of senile pathological pulmonary conditions, four claim our particular attention: bronchorrhœa, bronchitis, pneumonia, and tuberculosis. The ready engrafting of bronchitis upon bronchorrhœa, and the great tendency of the former to become chronic, the easy extension of bronchitis into pneumonia, and the insidious course of tuberculosis in the aged and its unsuspected frequency, necessitates in a discussion of bronchitis an excursion into contiguous fields of investigation. However, this shall be as short as is possible.

The cough in the aged is so frequent and constant a symptom that even the patient comes to look upon it as a necessary evil, and to regard its presence with resignation if not complacency. The cyanotic, wheezing, expectorating old man, overclothed, hugging a warm corner, is a familiar picture. At times he seems to improve—he goes out with confidence--but a change in the direction of the wind, a variation in the thermometer, or an overcasting of the sun, and he seeks his corner again with precipitous haste. For all that his expectoration is generally mucus, yet the mucopurulent variety is not uncommon. His respiration and pulse-rate are accelerated, as in all individuals afflicted with senility, but the former far more than the latter. As for temperature, the axillary is generally normal, the rectal somewhat raised, probably more than the normal difference. The bronchorrhœa of the aged passes, by almost imperceptible steps, into active bronchitis so frequently that the physician is taken by surprise. Chilly sensations, general malaise, increase of cough, local pains, all may be wanting, and yet the rapidly increasing purulency of the sputa, the high rectal temperature, and the duskiness of the face proclaim that bronchitis is present. The respiratory rate may not be much above the normal (for the aged) unless the smaller tubes are invaded, forming the formerly called capillary variety. No auscultatory signs, beyond coarse and fine mucous râles, and occasional sibilant or sonorous râles, are found. In estimating the percussion-note the peculiar resonance developed over calcified costal cartilages and united articulations should be eliminated, as well as various shades of resonance over dilated bronchi. Senile pneumonia is equally insidious, but in this case thorough percussion will develop flatness, frequently at the apex, increased vocal resonance and fremitus, and a higher pitched inspiration confirm the suspicion raised by rapid respiration, marked prostration, and general apathy. To distinguish pulmonary tuberculosis in the aged from senile bronchitis is no easy matter at times, for the former somewhat rarely leads to large cavity formation or extensive infiltration, but is noted for its chronicity and comparative mildness. Bacteriological investigation does not always show bacilli, and observation over some time is needed in case of failure of the microscope to establish the diagnosis. The diagnosis of senile pulmonary tuberculosis may be established only at the necropsy.

Senile bronchitis tends always to become chronic, because senility follows the same course. But whether acute or chronic it behooves us to afford the greatest possible relief to the patient. I do not say cure until it is shown that senility can be cured or even senescence arrested.

In treatment, symptomatically speaking, the amount of expectoration must be lessened. Here belladonna, which yields such brilliant results in childhood, generally fails. The true expectorants, as apomorphine or cocillaña, increase the amount so much that the distress of the patient is augmented, and the fixed chest and weakened musculature militate against the expulsion of the sputum, although it may be more liquid. The nauseating expectorants are liable to interfere with digestion, and for that reason are doubly objectionable. Of the drug remedies, I would place strychnine and ammonium carbonate in the first rank. In acute exacerbations of chronic bronchitis ammonium carbonate, in five or ten-grain doses, given in two or three ounces of milk, not only liquefies secretion, but also stimulates the heart, stimulates the bronchial muscles, and thus relieves venous congestion and dyspnœa. As a rule, its action is more energetic, as Fothergill pointed out many years ago, when the skin is moist. The only disadvantage is, that after a week or more it is apt to disarrange the stomach ; but that period is longer than most patients require its use. For chronic bronchitis and convalescence from the acute form, strychnine sulphate, in from one-fortieth to one-twentieth of a grain, every three to six hours, not only does quite as much as the ammonium salt, but, in addition, is a more powerful stimulant to the right heart, as was shown years ago. Contrary to what is generally supposed, it is not a vasomotor constrictor, and, therefore, does not increase the work of the heart. Besides, this drug improves nutrition by stimulating the spinal cord and peripheral nerves and the respiratory centre, aids digestion, and is, in a limited way, a gastric antiseptic. To disinfect the expectoration, creosote carbonate, in twenty-drop doses, given in two ounces of sherry, repeated every four hours until purulency disappears, is effective. Ordinary creosote should never be given to the aged, because of its irritant effect on the kidneys. With copious secretion and difficult expectoration this is the drug of choice, frequently preventing the low fever from absorption of putrid material, which so often occurs. In this connection I would most strongly condemn the use of opium, or any of its alkaloids, which is directly responsible for either speedy death from asphyxia (simply drowning the patient in his own secretion), or more gradually in producing this absorption, to which allusion has been made. Opium relieves cough by rendering the patient unconscious of its cause, and lulls the physician into a feeling of false security.

Naturally, associated conditions as gout, cardiac or renal disease, should receive attention.

Of physical measures, massage yields the most brilliant results. Systematic general massage, especial attention being paid to the chest, will increase chest expansion, improve nutrition, and not only facilitate expectoration, but diminish its formation. A warm, dry atmosphere is essential. An artificially dry atmosphere can be obtained in the patient's own room by exposure of calcium chloride or strong sulphuric acid in shallow earthen receptacles. Dust, so common in our city houses, must be filtered out, else asthmatic symptoms will become severe. This can be done at the inlet of the warmed air, or by the wearing of a Robinson respirator. Inhalations of steam, benzoinated liquids and similar remedies have always been failures in my experience. Camphor as a tincture is, however, an exception. Wool should be worn next to the skin, and the feet should be kept warm. "Taking cold" can be avoided by vigorous cutaneous friction with the flesh brush, practised daily, and inunctions of vaseline to the back of the neck and soles of the feet. To avoid night asthmatic attacks, and chilling during them, hearty evening meals should be discouraged—a meat diet is preferable. Unless the patient is a habitual drinker, alcohol should be sparingly used, and my preference is for a good port. Quite essential is a free movement of the bowels, best obtained by increasing the strychnine and the occasional use of the pharmacopœial compound vegetable cathartic. As for muscular exercise, much depends upon the habits and the strength of the patient. If chilling can be avoided it should be encouraged.

In this somewhat hasty review of the salient points in the presentation of senile bronchitis I trust the important points will not be lost sight of, and they are these:

1. Careful diagnosis.
2. Use of strychnine and ammonium carbonate.
3. Prohibition of opium.
4. Systematic massage.
5. Improvement of the general health. By giving close attention to our patients suffering from a condition sufficiently common not to attract careful study, I am sure we can do much not only to preserve life, but also toward making the last days of these patients their best days, and delay their passage by smoothing their way toward the end which awaits all mortals.

A CASE OF MULTIPLE NEURO-FIBROMATA OF THE ULNAR NERVE.[1]

By W. W. Keen, M D., LL.D.,
PROFESSOR OF THE PRINCIPLES OF SURGERY AND OF CLINICAL SURGERY, JEFFERSON MEDICAL COLLEGE, PHILADELPHIA,

AND

William G. Spiller, M.D.,
PROFESSOR OF DISEASES OF THE NERVOUS SYSTEM IN THE PHILADELPHIA POLYCLINIC, ASSOCIATE IN THE WILLIAM PEPPER LABORATORY OF CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA.

Surgical Report by Dr. Keen.

B. L., a laborer from Northumberland, Pa., aged forty-seven years, first consulted me April 17, 1899. His father died of tuberculosis; mother, of unknown cause. Neither of them suffered from rheumatism. The patient has suffered for twenty years from rheumatism, especially in his knees. For many years past there have been some tender nodules in the palm of his left hand. He is doubtful whether they are made worse by bad weather. At first they were painful only when compressed in handling a spade, axe, or any other such tool, but gradually the pain became continuous and kept him awake many nights. It was often so severe that he could scarcely refrain from outcries when it darted through his hand. As he expressed it, "The jumping toothache wasn't in it compared to this pain."

In January, 1892, another surgeon removed two of these nodules. Stellate scars at each place mark the site of the wounds, which suppurated. No microscopical examination of the tumors seems to have been made. He has now nodules at the places marked *a* to *f*, Fig. 1. These existed at the time of the prior operation, but as they were not painful they were not removed. The one in the forearm, marked *a*, is painful only occasionally, when, by accident, pressure is applied to it. The others are all spontaneously painful.

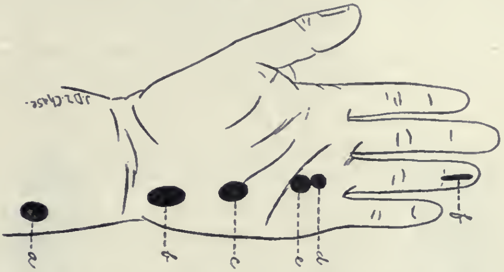
For twenty years also he has had a *fistula in ano*, for which two ineffectual operations have been done. Three openings about 3 cm. anterior to the anus, surrounded with a great deal of induration, were found.

Operation, *April* 18, 1899. I first made an incision above the wrist and exposed the ulnar nerve (at *a*, Fig. 1), in which I found a fusiform expansion, caused evidently by a mass in its interior. An incision made very carefully in the axis of the nerve enabled me to separate the fibres to each side, and with an Allis dissector to shell out from the interior of the nerve an oval tumor with a small filament 1 to 2 mm. in diameter at each pole of the tumor. It was quite a surprise to me to find so large a tumor, in view of its being so obscurely felt before operation. The same remark would hold true of all the others. A second incision was made at the eminence of the little finger (at *b*, Fig. 1), and a similar tumor again shelled out of the ulnar nerve. A third incision just above the web, between the ring and the little finger (at *d*, *e*, Fig. 1), revealed two such tumors, and as I could now feel another tumor in the middle of the palm (*c*, Fig. 1), midway between the last two incisions, I made these incisions continuous and shelled out all the tumors. On the pulp of the ring finger opposite the last interphalangeal joint (*f*, Fig. 1), two quite small tumors were found, and the entire nerve, with these

---

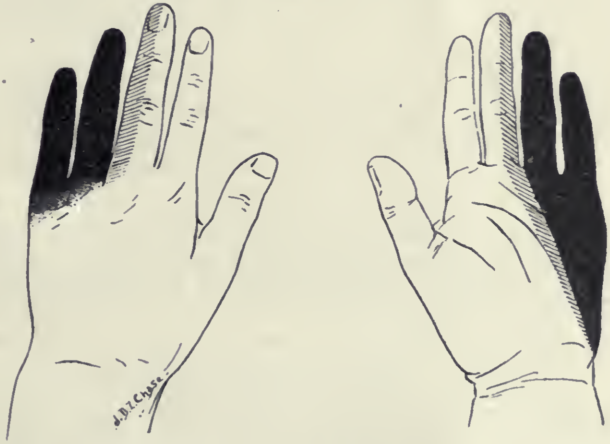
[1] Written for the Jacobi Festival volume. Read before the College of Physicians of Philadelphia, April 4, 1900.

FIG. 1.



Showing position of the tumors. Compare this with Fig. 4.

FIG. 2.



Showing the condition of sensation in the left hand of B. L., April 18, 1899, just before operation. The black area shows hyperæsthesia for all qualities, excepting cold on the median side of ring finger. The parallel lines represent the hypæsthetic area. On the back of the middle finger the hypæsthesia was uncertain.

Sensation was tested for heat, cold, pain, and touch.

The ulnar side of the left hand was *hyper*sensitive for all qualities except on the median side of the ring finger; here cold was not perceived quite so distinctly as in the corresponding portion of the right hand. The median side of the ring finger, palmar aspect, seemed to be somewhat *hyper*sensitive to all qualities except cold. The ulnar side of the middle finger, both palmar and dorsal aspects, showed diminished sensation. When the patient was touched over the scar on the palm of the left hand—the scar made by a previous operation on the ulnar nerve—he perceived the sensation in another scar situated on the ring finger of the same hand. When he was touched over the scar in the ring finger, he located the sensation correctly. The hyperæsthesia was doubtless due to the irritation of the nerve fibres caused by the presence of the tumors. Pain prevented a firm grasp by the left hand.

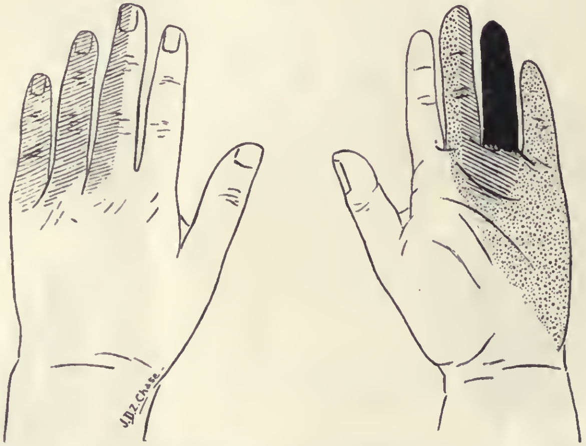
two tumors, was removed (see Fig. 4). All the tumors were oval in shape, with a small filament at each pole (see Fig. 4).

The fistula was then operated upon.

He made an uninterrupted recovery without febrile reaction, and left the hospital on the twelfth day, entirely well.

He writes me, under date of November 14th, that his present condition is as follows: He has no pain either in his hand or arm, and has full use of the hand, but still suffers from rheumatism.

FIG. 3.



Showing the condition of the sensation in the left hand of B. L., April 27, 1899, nine days after the operation. The black area represents the nearly anæsthetic area, the parallel lines on the palmar surface represent the hypæsthetic area, and the dots the hyperæsthetic area. On the middle finger the hyperæsthesia was uncertain. On the back of the hand the parallel lines represent the slightly hyperæsthetic area.

Sensation was tested for heat, cold, pain, and touch, and the limits of the areas corresponded for each form of sensation, *i e.*, there was no dissociation of sensation. The palmar surface of the left ring finger was almost anæsthetic in all forms of sensation. The *ulnar* side of the middle finger was hypæsthetic, but the thumb side of the middle finger and the whole of the little finger, and the ulnar side of the palm as high as the wrist, were slightly *hyper*æsthetic; except that the portion of the palm above the middle and ring fingers was *hyp*æsthetic; above the wrist disturbance of sensation was uncertain. The thumb and first finger exhibited normal sensation.

On the dorsal aspect the middle, ring, and little fingers were somewhat more sensitive than the corresponding fingers of the right hand. The thumb and first finger were normal. The back of the hand was also normal.

REMARKS. In Dr. Spiller's report on such neuro-fibromata most of the essential facts are stated, and the most important references are given, and need not be recapitulated here. Operation is essential, for if left the tumor steadily increases in size. This results in constantly increasing pain, and by reason both of the pain and its consequent motor disturbances the usefulness of the hand is impaired or even lost. Moreover, from the constant pain the patient becomes very irritable. Malignant degeneration in a nerve after neuro-fibromata have been removed is by no means unknown, but the risk incurred by such an operation is justifiable in view of the symptoms produced by the tumors, and malignant degeneration may occur in these tumors even when no operation has been performed. In the present case the mode of operation was clearly indicated, and when the tumors are central in the nerve, as in this case, they should be shelled out. If they exist upon the side, they should be dissected carefully from the nerve, doing as little injury to its fibres as possible, yet removing as far as possible all the diseased tissue. Whether all diseased tissue has been removed is an extremely difficult thing to determine absolutely, for from each pole of the tumor the disease may pass a considerable distance up and down the nerve, or it may exist at some other part of the nerve without causing clinical manifestations. If the tumor is too large or too intimately connected with the nerve to allow of either of these methods of operation, two resources still remain; first, a resection of the entire nerve or amputation of the limb. The latter is not uncommonly necessary in the leg, because such tumors, in connection with the sciatic, are apt to be very large and also to undergo malignant change. Resection of even so large a nerve as the sciatic does not always result in total paralysis, and even should this follow, sensation and motion may occasionally be restored either through lateral paths or by a greater or less regeneration of the nerve. Such complete regeneration I have seen personally more than once in the inferior dental nerve.

One danger attends operation, especially if all the diseased tissue has not been removed, namely, a rapid and malignant recurrence.

In Robert W. Smith's monograph, republished in 1898 by the New Sydenham Society, many admirable drawings of such tumors will be found.

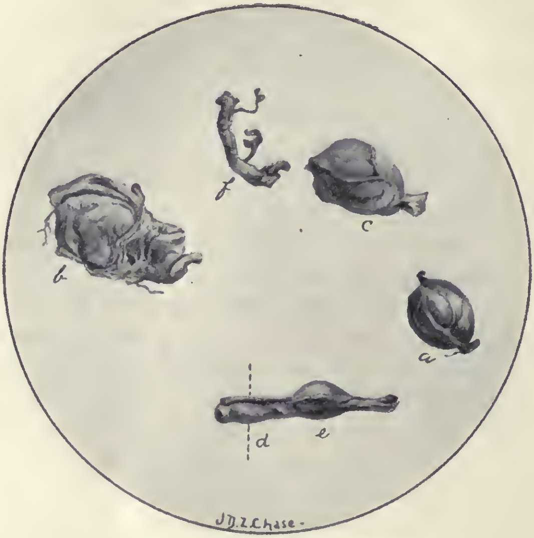
PATHOLOGICAL REPORT BY DR. SPILLER.[1]

The tumor designated in Fig. 4 as *c* was studied microscopically. Sections made about half-way between the two ends of the growth showed that the centre of the sections was formed by dense bands of connective tissue interwoven with one another and running in various directions. Most of these fibres had a transverse course, but some ran longitudinally, and were, therefore, cut transversely in transverse sections of the tumor. Numerous nuclei, deeply stained by Delafield's hæmatoxylin, were found mingled with the fibres, and most of these nuclei were elongated; some, however, were round. It is difficult to determine whether the latter were merely elongated nuclei, cut transversely, or were really round nuclei, but probably most of them were elongated nuclei. Toward the periphery of the growth the fibrous tissue was looser and contained many nuclei, and this looser fibrous tissue passed rather abruptly into the circular bands forming the perineurium (Fig. 5). Bloodvessels were rare in the centre of the tumor where the

---

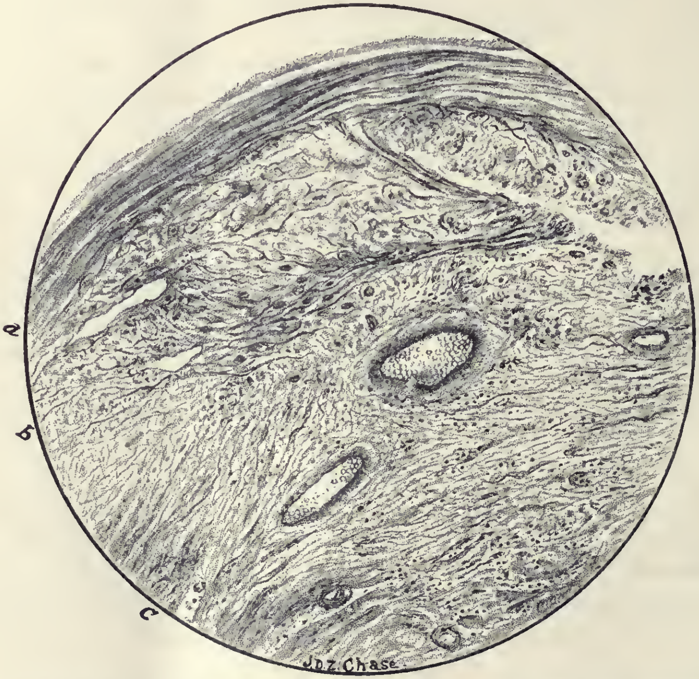
[1] From the William Pepper Laboratory of Clinical Medicine, University of Pennsylvania (Phœbe A. Hearst Foundation).

FIG. 4.



Actual size of the tumors removed.

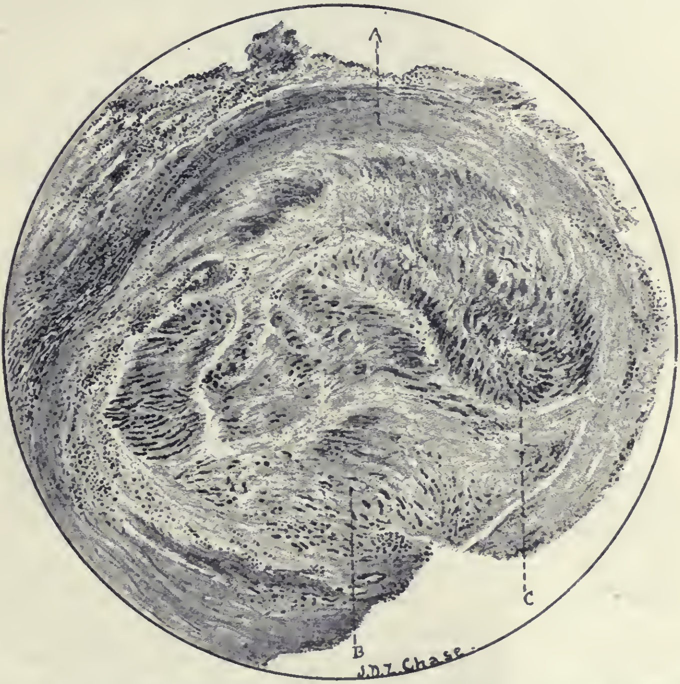
FIG. 5.



Oc. 3, Ob. 3. A section from the tumor taken near the centre of the growth. *a*, perineurium; *b*, loose connective tissue near the periphery of the growth; *c*, dense connective tissue forming the centre of the tumor.

dense fibrous tissue was found, but were quite numerous in the looser tissue at the periphery. About some of the vessels at the periphery of the growth an area was found that showed a groundwork not staining well with ammonium carmine, but containing numerous delicate wavy fibres arranged circularly about the vessel. By Weigert's hæmatoxylin method a few scattered nerve fibres were seen within the looser tissue at the periphery of the tumor, but none were found in the central dense fibrous formation. The perineurium was not much thickened. The proliferation of connective tissue evidently began in the endoneurium and in the centre of a nerve bundle. Nerve fibres were found in sections taken from each end of the tumor (Figs. 6 and 7), and it was evident from these and the sections from the middle of the tumor that nerve fibres extended from one extremity of the tumor to the other, although they were not numerous.

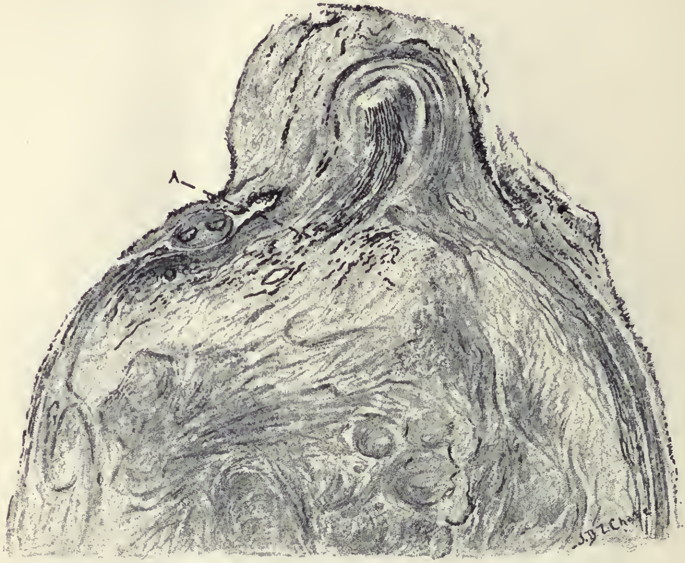
FIG. 6.



Oc. 3, Ob. 3. Transverse section from one extremity of the tumor, *c*, showing the nerve fibres widely separated from one another by proliferated connective tissue; A, perineurium; B C, nerve fibre.

The description of the tumor designated as *c* in Fig. 4 applies to the smaller growth designated by the letter *d* at the part marked by a horizontal line. In the tumor *d* the zone of looser fibrous tissue was between a dense central and a dense peripheral area. This small tumor also contained a few nerve fibres distinctly shown by Weigert's hæmatoxylin method. In some of the nerve bundles removed—seen as a narrow band upon the tumor *d* in Fig. 4—and cut with the tumor *d*, the connective tissue proliferation was seen in an early stage; the individual nerve fibres were separated a little more than normally by a slight excess of connective tissue, and in some places where the connective tissue was in still greater amount the nerve fibres appeared somewhat atrophied, as though they had suffered from the pressure of the proliferated tissue. In these nerve bundles the proliferation was distinctly seen to begin in the endoneurium. These nerve bundles were distinct from the tumor *d*, but formed an integral part of the tumor immediately adjoining, designated as *e* in Fig. 4. This was proof that the proliferation of the endoneurium was not confined to one or two nerve bundles within the ulnar nerve, and it would indicate that at one part of the nerve one bundle was affected, and at another part another bundle.

FIG. 7.



Oc. 3, Ob. a_2 (Zeiss). Longitudinal section of the tumor *c*, showing medullated nerve fibres entering at one extremity of the growth and passing to the periphery of the tumor (*A*).

The piece of nerve designated as *f* in Fig. 4 was found by microscopical sections to contain three nerve bundles presenting different degrees of thickening of the endoneurium, and the perineurium of these bundles was considerably thickened.

The connective tissue of the nerves in some persons exhibits a remarkable tendency to proliferation, and this proliferation may cause the condition known as generalized neuro-fibromatosis, in which multiple neurofibromata, multiple cutaneous fibromata, plexiform neuro-fibromata, elephantiasis of the skin, and pigment nævi occur.

To one unfamiliar with the literature the classification of fibro-neuromata with some of the forms of generalized fibromatosis mentioned would seem unwarrantable, and a brief *résumé* of some of the more important papers is desirable for a proper understanding of this rather difficult subject, especially as most of the literature is in the German language.

The relation of these various pathological formations to one another has not been universally recognized. Virchow believed that a relation existed between the multiple cutaneous fibromata, the neuro-fibromata, and certain forms of congenital elephantiasis (Goldmann), and v. Recklinghausen[1] showed that the fibromata mollusca are fibromata developed on the cutaneous branches of nerves. Marie[2] states, in an excellent paper on this subject, that v. Recklinghausen's view is pretty generally accepted, but not by all. Marie does not include every fibroma molluscum under the generalized neuro-fibromatosis. In one of the two cases of general neuro-fibromatosis reported by him an autopsy was obtained. He was unable to find any fibromata on the nerves, or to find nerve fibres in the cutaneous tumors removed from the cadaver. The case clinically was a typical one of generalized neuro-fibromatosis, and in two cutaneous tumors removed during the life of this patient a few nerve fibres were found. The absence of nerve fibres in the tumors removed from the cadaver, of course, does not prove that these tumors did not have their origin in the cutaneous nerves. The cutaneous nerves are small and may be destroyed in fibromatous thickening. The examination of the growths removed by Professor Keen has shown me that the nerve fibres within the tumor may be entirely destroyed in places by the proliferation of the connective tissue, and this is doubtless true of the nerve fibres in the fibromata of the skin.

While certain writers have contended that the multiple fibromata of the skin arise in the connective tissue of the cutaneous nerves, some make the connective tissue surrounding other structures—about the roots of the hair, glands, and vessels—responsible for the proliferation. This question has not been positively decided. For example, Goldmann[3] reported a case of congenital plexiform neuroma (the first case in his paper) in which microscopically numerous fibromata were found in the skin, and all of these were in relation with cutaneous nerves. Apparent thickening of the adventitia of the vessels, of the hair sheaths, of the sweat-glands and sebaceous glands was in reality due to a fibromatosis of the nerves supplying and surrounding these structures. This case supports the view of the unity of the process in multiple cutaneous fibromata and multiple fibro-neuromata of the nerves. On the other hand, in a paper published by Finotti[4] three years later, different conclusions were reached. Finotti believed from his studies that the multiple fibromata did not originate exclusively in the nerves. The writers seem to agree that in structure the cutaneous fibromata and the fibroneuromata of the nerves are very similar. The literature on this subject is given in a recent paper by Merken.[1]

---

[1] v. Recklinghausen. Ueber die multiplen Fibrome der Haut, etc., 1882.

[2] Marie. Leçons de clinique médicale, Hotel Dieu, 1894–1895.

[3] Goldmann. Beiträge zur klin. Chirurgie, 1893, vol. x.

[4] Finotti. Virchow's Archiv., 1896, vol. cxliii. p. 133.

The generalized neuro-fibromatosis is known also as v. Recklinghausen's disease and as elephantiasis nervorum. Under the latter term Hartmann[2] classes the neuro-fibromata of the nerves, the fibromata mollusca, cutaneous enlargements, and pigment spots—all are manifestations of a congenital tendency of peripheral nerves to tumor-formation. The designation of elephantiasis neuromatodes is employed by Scheven[3] to include plexiform neuromata, fibromata mollusca, and fibromatous thickening of nerve trunks.

The plexiform neuroma seems to be a part of generalized neuro-fibromatosis. P. Bruns[4] has had an unusual opportunity to study this form of growth—as the study of eight cases of this rare tumor may well be considered unusual. He says that the Rankenneuroma (plexiform neuroma) is one of the forms of congenital elephantiasis known also as the fibromatous diathesis, and is the result of fibromatous thickening of the nerves of a circumscribed territory. It differs only in form from the multiple fibromata of the skin and nerve trunks. This is shown by the congenital and occasionally hereditary tendency to the formation, the simultaneous appearance of the different forms in the same person, the same histological structure, etc. Bruns was able to collect in all, including his own, forty-two cases of plexiform neuroma from the literature (1891); in three of these heredity was observed through three generations; in the first two generations multiple cutaneous fibromata, multiple fibromata of the nerve trunks, and elephantiasis occurred, and in the third generation the plexiform neuroma appeared. Bruns, therefore, classes under elephantiasis the plexiform neuromata (Rankenneuroma), multiple cutaneous fibromata, multiple fibromata of the nerves, and colossal elephantiasis; and he shows that the disease may be hereditary, appearing in one form in one generation and in another in a following generation. The term elephantiasis neuromatodes seems to have originated with Bruns, but he distinguishes other forms: the elephantiasis teleangiectodes and the elephantiasis lymphangiectodes, according as the bloodvessels or lymph-vessels are involved.

The relation between multiple fibro-neuromata and elephantiasis was recognized in two cases by Jordan.[5] The vascular system was the source of a connective tissue hyperplasia causing great thickening of the skin and subcutaneous tissue and the formation of tumors in the nerves and muscles. Fibromata mollusca were found in both cases. In one patient the right lower limb had a circumference of 75 cm. and the left 22 cm., and the right lower limb was greatly deformed. Jordan was unable to classify these cases under any of the three forms of elephantiasis (elephantiasis fibromatosa, teleangiectodes, neuromatodes) known to him. Macroscopically the condition was one of elephantiasis fibromatosa with multiple fibromata mollusca, multiple neuromata, and thickening of the large vessels; microscopically the vessels were found to be the structures in which the hyperplasia began, so that in both cases there was a combination of different forms of congenital elephantiasis. Jordan doubts whether cases of congenital elephantiasis in which only the skin and subcutaneous tissues are affected exist—*i. e.*, cases of solitary pachydermatocele.

---

[1] P. Merken. Wiener klin. Wochenschrift, 1899, Nos. 32, 33, and 34.

[2] Hartmann. Beiträge zur klin. Chirurgie, vol. xvii. p. 177.

[3] Scheven. Ibid., p. 157.

[4] Bruns. Ibid., vol. viii. p. 1.

[5] Jordan. Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie, vol. viii.

Herczel[1] was able to observe that in a pachydermatocele the proliferation of the connective tissue originated in the thickened fibrous nerve bands; that it was a true elephantiasis neuromatodes.

The frequency of pigment nævi in generalized fibromatosis has been noted by many writers, and in a careful microscopical study Soldan[2] has recently shown that these pigment nævi (Pigmentmäler) are in the majority of cases the first recognizable signs of a fibromatous process of the connective tissue of the nerves. The different forms of neurofibromatosis are conditioned by the localization, anatomical relations, and energy of growth.

This brief summary of some of the most important writings on generalized neuro-fibromatosis is sufficient to show that we are justified in classing under one head the neuro-fibromata of the nerves, the cutaneous fibromata, the plexiform neuromata, certain forms of elephantiasis, and certain pigment nævi. It does not follow, however, that all cutaneous fibromata arise in the nerves.

The causes of generalized neuro-fibromatosis are unknown. Reference has been made to the fact that heredity plays a rôle in some families, and in addition to the cases cited I may mention that Menke[3] observed neuromata in members of three generations—grandmother, mother, and son—and he says a heredity through three generations existed only in the cases cited by Herczel, Bruns, and Czerny. Most writers agree that the condition is not usually an acquired one. The tendency exists from the birth of the person, although the proliferation of connective tissue may not be observed until comparatively late in life. Trauma may in some cases cause the manifestation of a latent tendency in nerves.

Another important question that demands attention is in relation to the tendency of these fibromata to malignant degeneration. Several investigators have shown that this danger is not an imaginary one. Goldmann (*l. c.*) demonstrated by one of his cases that an apparently benign neuro-fibroma may undergo malignant change, or, better stated, present a malignant course, and he quotes a number of similar cases. According to him, this malignancy is not a change in the character of the tumor, but is due to the fact that a sarcoma of the nervous system may occasionally show a slow growth for a long time.

---

[1] Herczel. Ziegler's Beiträge, vol. viii.

[2] Soldan. Archiv für klin. Chirurgie, vol. lix., No. 2, p. 261.

[3] Menke. Berliner klin. Wochenschrift, October 31, 1898, No. 44, p. 974.

According to Finotti (*l. c.*), numerous observations have demonstrated that solitary plexiform (Herczel) and multiple neuromata (Genersick, Czerny, Winiwarter, Westphalen) have a great tendency to change into sarcomatous tissue. His words are "Umwandlung in Sarcomgewebe." Distinct clinical differences between secondary and primary sarcoma—that is, neuro-fibromata that have undergone sarcomatous change and those that are sarcomatous from the beginning--do not exist, according to Finotti, at least not in the majority of the cases.

Trauma may be the cause of this malignant degeneration, but in some cases no cause can be demonstrated (Garrè, Hartmann and others). Hartmann states that one of a number of neuromata may increase rapidly in size, and when it is removed by operation another tumor may develop rapidly in the same nerve trunk at the site of the former growth —more frequently, however, in another nerve territory. The second tumor is usually more malignant than the first; it involves adjoining tissue, and comparatively late metastasis occurs, causing the death of the patient. Garrè[1] also noted the increased malignancy of the process after operation. Hartmann[2] reports a case which he says showed well the transformation of a fibroma of the nerve into a sarcoma, and he confirms the experience of others that the rapid increase in a neuroma, the occurrence of neuralgic pain, and sarcomatous degeneration occur at the same time. He refers also to the fact that in ten of the seventeen cases of malignant degeneration in fibro-neuromata mentioned by Garrè death was due to a return of the tumor.

Four cases of general neuro-fibromatosis, with multiple neuro-fibromata, were observed by Thomson.[3] In the first of these one of the tumors underwent sarcomatous change, with general dissemination of sarcoma and death after attempted removal; in the second also, after operative intervention, malignant change occurred. Scheven (*l. c.*) also refers to the pronounced tendency of the elephantiasis neuromatodes congenita to sarcomatous change, and to the fact that this tendency remains in the fibromatous nerves after a tumor that has undergone a malignant change has been removed. The surgeon can do nothing more than remove the malignant tumor; the tendency to degeneration remains in the widely developed pathological tissue. Scheven reports also a case of malignant degeneration in elephantiasis neuromatodes, and refers to the fact that in Finotti's case the sarcomatous transformation in the neuroma could be demonstrated microscopically.

---

[1] Garrè. Beiträge zur klin. Chirurgie, vol. ix. p. 465.

[2] Hartmann. Ibid., vol. xvii. p. 177.

[3] Thomson. British Medical Journal, October 10, 1896, p. 1024.

We owe to Garrè's (*l. c.*) investigations the knowledge of the frequency of the degenerative change in neuro-fibromata. Garrè was able to collect sixteen cases from the literature—seventeen with one of his own —in which sarcomatous degeneration in congenital neuromatosis had occurred. There are, of course, many more cases of malignant tumors of nerves not the result of degeneration of a fibro-neuroma. In these seventeen cases those of sarcoma arising in cutaneous fibromata are not included. Garrè showed that in an eighth of all cases of supposed benign neuro-fibromata this sarcomatous change occurs.

It is important to know what constitutes a sarcomatous degeneration in a neuro-fibroma. Rapidity of growth is suspicious, according to Garrè, but is not always reliable; large size of the growth is not a positive sign, and even histologically the transformation of a benign fibroma into a sarcoma may be difficult to determine. The greater or smaller number of tumor cells is the determinative factor, but there are cases in which the diagnosis between fibroma and sarcoma cannot be made with certainty, and Garrè says that there are transitional forms between the neuro-fibroma and the sarcoma, and that these cannot be properly classed clinically or histologically. Paræsthesia, paresis, neuralgic pain, etc., are important in diagnosticating early and clinically the sarcomatous degeneration of a neuro-fibroma. The malignant change causes rapid destruction of the nerve fibres within the tumor, with the production of disturbances in motility and sensation.

It seems to me a broad and proper view to regard such neuro-fibromata as were removed by Professor Keen as an incomplete manifestation of generalized neuro-fibromatosis, although the process was confined to one nerve—the ulnar. The fibromatosis does not differ from that occurring in cases with more extensive clinical manifestations, and the limitation of the process so far is no proof that later we shall be unable to trace evidences of a more general fibromatous change. A number of cases have shown that the fibromatosis of nerves may remain undetected until the patient is well advanced in years. We understand likewise that Professor Keen's patient is exposed to the danger of malignant growth at any time.

The location of the tumors in Professor Keen's patient is especially interesting. Garrè, in speaking of his case, says that the presence of multiple small fibromata in the skin of the sole of the foot was very remarkable, and refers to the fact that v. Recklinghausen emphasized the immunity of this part and of the palm of the hand. Marie (*l. c.*)

likewise says that in generalized neuro-fibromatosis the tumors are not usually found in the hands and feet.

It is curious that only certain nerve bundles of the ulnar nerve were affected in Professor Keen's patient, but such a condition is well known. Goldmann (*l. c.*) says it is difficult to understand why in the same nerve trunk, even in the same bundle, the proliferation may involve only certain groups of fibres.

Bowlby[1] describes a specimen of multiple fibromata on a single nerve (posterior tibial) seen in the museum of the Middlesex Hospital. No tumors were found on any other nerve. This seems to have been the only case of the kind which had come under his observation when he wrote his book. A similar case was published by J. K. Mitchell,[2] and W. J. Taylor operated on a patient with neuro-fibromata of the foot, probably confined to a single nerve. As a contrast to Professor Keen's case and to Bowlby's I may mention that Smith reported one case in which the total number of neuro-fibromata existing upon the nerves removed from the body exceeded 800, and another in which upward of 1400 neuromatous tumors were removed with the nerves, and he felt that he was not exaggerating in stating that this patient must have had at least 2000 tumors. This work of Smith was originally published in the form of a very limited edition fifty years ago, but it was deemed of sufficient importance to be reprinted in 1898 by the New Sydenham Society. Some of the plates present nerves covered thickly with fibroneuromata, but no neuromata shelled out of a nerve, as in Professor Keen's case, are pictured in this atlas. Indeed, Smith[3] stated that the results had not afforded much encouragement to the practice of dissecting out the tumor from the branches of the nerve among which it was entangled. According to Smith, there are few affections more rare than neuro-fibroma.

Smith was not able to trace nerve fibres through a neuro-fibroma, although in a few instances he observed some nervous filaments entering the superior extremity of the tumor. I have been able to detect the presence of nerve fibres in both extremities and also in the centre of one of the tumors (*c*, Fig. 4) removed by Professor Keen, and my success was probably due to the fact that I had Weigert's hæmatoxylin stain at my command. In the smaller tumor (*d*), nerve fibres were also seen within the tumor. This method was unknown when Smith wrote his treatise.

It is a merciful provision that the multiple neuro-fibromata are usually painless, and it seems extraordinary in contrast that the solitary tumor is often painful.

---

[1] Bowlby. Injuries and Diseases of Nerves and their Surgical Treatment, p. 493.

[2] J. K. Mitchell. The University Medical Magazine, November, 1897.

[3] Smith. A Treatise on the Pathology, Diagnosis, and Treatment of Neuroma. The New Sydenham Society, 1898.

Many investigators have observed that the proliferation begins in the endoneurium, as it did in Professor Keen's case. It is due to this mode of origin that these neuro-fibromata are elongated with their long axes parallel to the nerve. The perineurium offers a certain amount of resistance, especially as it often becomes thickened simultaneously with the growth of the tumor, and the fibroma grows especially in the direction of least resistance. In the tumor designated as *c* in the drawing (Fig. 4), the perineurium forms a sheath, surrounding on all sides the proliferated endoneurium, and in the centre of the tumor no nerve fibres could be detected, except at the periphery. This proliferation of the endoneurium was evident also in the tumor *d* (Fig. 4), and in small nerve bundles, adjoining the tumor *d* and removed with it, the proliferation of the endoneurium could be detected in its early stages. Neuro-fibromata do not always originate in the endoneurium. In a case reported by Finotti, for example, the fibroma began in the epineurium and was adherent to the nerve.

The entire nerve on which the neuroma is formed may lie in the centre of the tumor or surround the tumor as a sheath. According to L. Bruns,[1] the nerve fibres caught within the neuro-fibroma show a remarkable resistance to degenerative processes, which explains the absence or mildness of the clinical symptoms in many cases. I am unable to fully confirm this statement from the examination of the tumors removed by Professor Keen. In two tumors, *c* and *d*, I found the nerve fibres within the tumor entirely destroyed, except at the periphery of the tumors, while in the piece of nerve marked *f*, in which the proliferation was not excessive, the nerve fibres were quite well preserved. I would prefer to explain the absence or mildness of the clinical symptoms by the slowness of the process, by the fact that only here and there a nerve bundle is attacked, and that many fibres —the majority in fact—remain intact and do not lose their function, although considerably compressed, as the process is slow enough to allow the nerve fibres to become accustomed to the pressure.

THE DIFFERENTIAL DIAGNOSIS OF ECTOPIC GESTATION.[2]

WITH THE REPORT OF CASES.

By Edward P. Davis, A.M., M.D.,
PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; VISITING OBSTETRICIAN TO THE JEFFERSON, PHILADELPHIA, AND POLYCLINIC HOSPITALS, ETC.

In the classic description of ectopic gestation the patient is said to have a uterus slightly enlarged, a tumor near the womb, and the subjective signs of pregnancy. When the gestation sac ruptures, in most cases these signs become more evident because the tumor increases through the formation of an hæmatoma. These signs, taken with the symptoms of anæmia and shock, point almost conclusively to the condition present.

---

[1] Bruns. Die Geschwülste des Nervensystems.

[2] Read before the College of Physicians, Philadelphia, March 7, 1900.

It has been my experience to observe two cases of ruptured ectopic gestation in which the classical signs were absent, and in which the differential diagnosis became a matter of great interest. Surgeons and physicians are called upon so frequently to treat patients in whom pain in the abdomen is associated with some degree of shock that the narration of these cases may not be without interest.

CASE I. was that of a primigravida of frail physique and highly organized nervous system, the wife of a physician. This patient had been married ten years, had menstruated regularly, and had never been pregnant. She supposed herself in perfect health, and was without signs of illness, when one day she rode upon a bicycle between one and two miles at a rapid rate, and during this ride was seized with a sharp pain in the right lower quadrant of the abdomen. She controlled her distress, however, and returned to her home upon her bicycle.

When seen soon afterward she had manifest shock, the abdomen was not swollen nor painful upon pressure, and there was no hemorrhage from the vagina. Palpation of the abdomen was negative. The patient instinctively flexed the thighs and began very soon to recover from the shock. She was at once put at absolute rest and in charge of a good nurse. Within a few hours her husband saw her, and, at his request, a vaginal examination was made, the results of which were negative. A possible enlargement of the uterus was present, but this was scarcely noticeable. Upon questioning the patient she remembered that she had not been unwell at the usual time and had gone between one and two weeks over the expected date. There was no history of severe previous illness, of obstinate constipation, of mechanical injury, or of apparent hemorrhage. There was entire absence of a tumor near the womb, of a distinct enlargement of the uterus, or any evidence by examination that hemorrhage had occurred into the abdomen or pelvis. The husband was informed that ruptured ectopic gestation was possibly present. The first pain which the patient experienced occurred at about 1 P.M. During the afternoon and evening the patient steadily reacted, although complaining of pain in the lower abdomen. The pulse and temperature were but slightly altered. The patient was given stimulants and morphine by hypodermatic injection. Preparations were made to open the abdomen in the early morning should indications arise.

Between 5 and 6 A.M. the patient grew worse, and as soon as possible the abdomen was opened. It was found that ectopic gestation in the right tube was present, that the wall of the tube had partially ruptured, and that the orifice had been closed temporarily by a clot. Later this had given way, and hemorrhage had taken place upward and backward among the intestinal coils. The tube was at once ligated and removed. The patient perished from shock within a few moments after the close of the operation.

In this case the diagnosis lay between ruptured ectopic gestation, disease of the appendix, ectopic pregnancy with threatened abortion, and the onset of delayed and painful menstruation. This last point may be illustrated by Case II.

Case II. was a woman who had borne two children in normal labors and who had menstruated regularly since the birth of her younger child. She was ordinarily in good health, but subject to intestinal colic and to indigestion. About the time when she should have been unwell, after exposure to cold and wet, she was attacked by severe pain in the left lower quadrant of the abdomen. This pain was reflected to the right side. The entire lower abdomen was painful upon pressure, the attacks of pain were successive at intervals of from twelve to twenty hours, and on one occasion the patient was seized, while sitting, with such severe pain that it was necessary to give her an injection of morphine before she could be placed in her bed. Her husband, a physician, made a vaginal examination, and, finding the uterus slightly enlarged, introduced a sound. The uterus was proved to be enlarged and probably empty. On examining the patient no pelvic tumor could be discovered, the womb was a trifle larger than normal, the abdomen sensitive as described, the patient's pulse slightly quickened, and her temperature normal. The attacks of pain had been so severe that the patient, although a courageous woman, dreaded the possibility of return. The bowels had moved thoroughly without difficulty.

The diagnosis of ectopic gestation seemed not impossible in this case. The husband was exceedingly apprehensive that such was the condition. On close questioning, however, the history of previous attacks of intestinal colic was elicited, and it was found that the pain while severe was unaccompanied by shock. The patient was placed at absolute rest, small doses of codeia were given, the diet was limited to liquids, counterirritation was placed over the abdomen, and the patient was carefully watched. In a short time menstruation appeared, and the patient speedily recovered.

In this case subinvolution accounted for the enlargement of the womb, the pain was that of intestinal colic, although its severity was unusual. There was but one classic symptom of ruptured ectopic gestation lacking and that was shock. A sign of ectopic gestation so often present—a tumor in the pelvis—was absent in this case.

Ectopic gestation may be complicated by the nausea of pregnancy, and the latter may for a time obscure the diagnosis.

Case III.—Mrs. S., aged forty years, was seen in consultation with Dr. Louis Jurist in December, 1899. Her only child was nineteen, and she had menstruated irregularly. For several months she had suffered from pain in the stomach with loss of appetite and persistent nausea. Her menstruation had probably been absent for nearly two months. There had been a vaginal discharge of blood four weeks before she was seen, although this did not seem to be the usual period. Eight days before coming under observation she had pain in the abdomen, which subsided after she had remained in bed. The patient denied positively the possibility that pregnancy was present. After slight improvement she left her bed and went about the house, when she was seized with sharp pain in the abdomen and severe shock. When seen by Dr. Jurist she was pulseless at the wrist, but gradually rallied.

When examined in consultation with him the patient was pallid, restless, thirsty, her pulse 122, small and weak, the tongue dry, coated, and brown in the centre, the abdomen was slightly enlarged in its lower half, painful on pressure, not tympanitic. On vaginal examination the womb was not evidently enlarged, was freely movable with very slight pain, and there was no tumor, exudate, nor mass in the pelvis. The cervix was unaltered.

The early history of the case was of marked gastro-intestinal trouble. The patient's nausea had been irregular but persistent, chronic constipation and dyspepsia had been present, and disease of the appendix had been strongly suggested by the symptoms. There was also a history of irregular menstruation, of previous disease of the womb or Fallopian tubes, whose exact nature could not be determined from the very obscure history given. It was my belief that the patient was suffering from ruptured ectopic gestation, the rupture occurring in the upper and posterior portion of the Fallopian tube, and the blood extravasating among the coils of intestine. She was at once transferred by ambulance to Dr. Keen's private hospital and prepared for cœliotomy. Upon consultation two views were expressed: one that the patient was suffering from ruptured abscess of the appendix and consequent infection of the abdomen, the other that ruptured ectopic pregnancy was present. In view of the first opinion I asked Dr. Keen to operate and assisted him. An incision was made over the appendix and Fallopian tube, and extravasated blood found amid the intestinal coils. An early embryo was found just above the right cornu of the uterus, and, with a mass of blood clot, was immediately removed. The site of the pregnancy had been the right cornu of the womb and the Fallopian tube at the point where it enters the uterus. The end of the tube was readily ligated and the torn portion removed, but persistent oozing occurred from the wall of the uterus. This was finally checked by ligating in mass and by the use of the thermo-cautery. Normal salt solution was poured into the abdomen and a packing of iodoform gauze carried behind the uterus, compressing the site of bleeding. This gauze was brought out at the lower end of the abdominal incision. Intravenous transfusion of fifty ounces had meantime been given. Although the patient's condition was critical during the operation, she reacted well. The embryo was 8 cm. long, and the chorion was found in the blood clot removed. This patient made an uninterrupted recovery, retarded somewhat by excessive nervousness and chronic intestinal catarrh.

But little mention is made in writings upon ectopic gestation of cases in which positive evidence of pregnancy and pelvic tumor are lacking. The possibility of their absence is admitted, but held to be extremely rare. In a considerable number of cœliotomies upon women, Schauta (*Monatsschrift für Geburtshülfe*, 1900, Band xi., Heft 1) found that ectopic gestation had been present in 5 per cent. of his cases. In many of these it had not been diagnosticated, and operation was performed for pelvic tumor or tubal disease. From Case I. we observe that when the rupture in the tube is but slight it may be closed temporarily by a clot, and the patient may rally from the initial rupture. An early embryo may readily die under these conditions, and, its absorption taking place, the patient would gradually return to her accustomed health. The diagnosis of these cases may be impossible under such circumstances. When the rupture is in the right tube (and this is more frequently the case than in the left) it is very difficult to distinguish between this condition and infection of the appendix.

From these cases we believe that shock referred to the abdomen occurring in women capable of pregnancy should invariably cause a suspicion of ectopic gestation, and that although pelvic tumor may not be found and many signs and symptoms of pregnancy be obscure, if the shock be pronounced the abdomen should be opened and the condition present accurately diagnosticated and promptly treated. We lay especial stress upon the development of shock as illustrated in Case II., where its absence was the only circumstance which made the diagnosis of ectopic pregnancy, to my mind, unlikely.

TWO CASES OF TABES DORSALIS IN NEGROES—HUSBAND AND WIFE.[1]

By Albert Philip Francine, A.M., M.D.,
of Philadelphia.

Tabes dorsalis is recognized as occurring rarely in the negro,[2] nine cases only having been reported; but the author has been unable to find reference to any instance in this race of the disease in husband and wife, as in the present case. Raecke[3] has collected twenty-two cases of tabes in husband and wife in which the subjects were white. Of four cases Weir Mitchell has seen, two occurred in mulattoes in Florida.

The following were both frank cases of tabes, the cardinal symptoms of the disease—*i. e.*, loss of reflexes, fulgerent pains, girdle sensation, ataxia and the eye symptoms—being typically demonstrable in both. The question of purity of blood, always a matter of doubt in the negro, is confirmed so far as the statements of the patients themselves are concerned. The occupation of the wife (having worked on a sewing machine for thirty-five years), in the absence of ascertainable evidence of specific infection, is interesting as a possible etiological factor. The mechanical[4] or non-specific theory for the origin of the disease in contradistinction to the more generally accepted syphilitic etiology as advocated by Erb[1] and Fournier[2] would seem applicable here.

---

[1] Shown before the Philadelphia Neurological Society, February 26, 1900.

[2] La Ataxia locomotriz (en el negro), Cron. Med. quir. de la Habana, 1892, xviii. 47–50. The Frequency of Locomotor Ataxia in Negroes. Burr. Journ. Nerv. and Ment. Dis., N. Y., 1892, xix. 278–281. F. H. Lloyd. Phila. Hosp. Reports, 1896, iii. 172 (case in negress).

[3] Paralyse und Tabes bei Eheleuten. Monatsschrift für Psychiatrie und Neurologie June, 1899, 266.

[4] Exhaustive Theory. Edinger. Sammlung klinischer Vorträge, No. 106, 1894.

A rare and interesting symptom is the disassociation between superficial and deep sensation as elicited in the case of the man, by his being able to differentiate between the head and the point of a pin when applied lightly to the skin of the lower part of the leg, but unable to do so, and suffering no pain when it is forcibly stuck into the flesh.

The anesthetic patches on the woman's breast and the hyperæsthetic spots spoken of in her history are probably due to functional rather than organic disease.

The double ptosis in the same case is interesting, though not particularly rare. Wilbrand and Saeger[3] have tabulated 65 cases showing this symptom, in 40 of which the ptosis was bilateral, in 25 unilateral.

The following cases were met with by the author in the dispensary of the Howard Hospital, and he is indebted to Dr. Charles Wirgman for permission to report them. He also desires to express his thanks to Dr. J. M. McCarthy for assistance in the study of these cases:

CASE I. Joseph A. W., aged forty-eight, married, colored, a barber.

Family History. Mother died of consumption, father of typhus fever; two brothers living and in good health; one sister has been operated on for tumor.

There is no family history of nervous disease ascertainable; mother's family all died of tuberculosis. Careful inquiry fails to disclose the presence of any white blood in his family, and he denies the possibility of this. He is also in appearance very dark.

Previous Personal History. Has had measles as a child, and since he was ten years of age says he has been rheumatic.

As an adult he has suffered with typhoid fever and grippe, the former being complicated by pneumonia; has a chronic cough, and has had occasional hemorrhages. Examination of chest reveals the presence of phthisis.

Had a hard chancre when he was about seventeen years old, *i. e.*, in 1869. He was at once put upon specific treatment, and did not suffer with secondary eruptions, though he did have a temporary alopecia. For the last two or three years he has completely lost sexual power.

Was married in 1888 to Eliza A. W., shown with the patient; has been employed as a barber to within two years of the present time; is a man of temperate habits, though for many years he took a morning whiskey, and still takes an occasional drink; has always smoked a pipe through the day, and occasionally chews tobacco; uses both tea and coffee in moderation.

History of Present Condition. About five years ago patient began to suffer with difficult vision, for which he consulted an oculist, and tabes being suggested by the ocular findings, he was referred to the Orthopædic Hospital (May 17, 1895),[1] where the diagnosis was made. He suffered at this time with slight ataxia, lightning pains in legs and body, a girdle sensation, and numbness in the soles of his feet.

---

[1] Deutch. Arch. f. klin. Med., xxiv. 1879. Centralblatt für die med. Wiss., March, 1881.

[2] De l'Ataxie Locomotrice. Fournier, Paris, 1882.

[3] Die Neurologie des Auges. Wilbrand und Saeger, Wiesbaden, 1899.

His ataxia has very gradually increased, and his pains continued to date. He says that the soles of his feet feel numb, and he cannot tell by the sensation, after he has removed his shoes at night, whether they are on or off, nor can he feel the floor when he walks in his bare feet.

He complains of a girdle sensation, and says that he has bladder trouble, which consists in difficulty in starting the act of micturition and some incontinence. At times during the last three years he has had involuntary seminal emissions without erection. Has considerable pain on going to stool; no gastric pain nor crises.

Complains also of shortness of breath on exertion, and says that he has lost weight.

Physical Examination. Patient is a small, dark-complexioned, colored man about five feet four inches in height, and weighs a hundred and thirty pounds.

His knee-jerks are absent, also to reinforcement, as are the plantar reflexes. There is marked dissociation between superficial and deep sensation, and slight retardation of tactile sensation in the soles of the feet. Muscular power is good. Babinski reflex is absent.

His gait is markedly ataxic and he walks with a cane. Station with the eyes open is fair, but with the eyes shut there is marked swaying. He is unable to walk in the dark. Coördination of the fingers is poor.

Hearing is good for both high and low pitched notes, and taste and smell appear to be normal. There are no hyperæsthetic or anæsthetic zones discoverable.

Examination of the eye by Dr. William Campbell Posey reveals 5/IV vision in right eye, 5/VII in left. Pupils 2½ mm. Irises do not react to light but promptly to accommodation and convergence. There are no palsies of external ocular muscles. Right optic nerve is pale, and the left decidedly atrophic (primary atrophy). Fields normal in right eye; fields in left contracted centrally for form and color.

Case II.—Eliza A. W., (wife of the above), aged fifty-two years; married; colored; by occupation a seamstress.

Family History. Mother died of consumption; father of accident; one sister of consumption; one brother of smallpox. No family history of nervous disease ascertainable. Denies any white blood in her family.

Previous Personal History. Does not remember to have been sick much, even as a child. Has suffered with "cold in the head" from time to time, but has otherwise enjoyed uniformly good health. Has had a weak back, however, and has suffered with nervousness for the last ten or twelve years.

Has been married twice and had two children by first husband, the last being still-born. She accounts for the death of this child by an overdose of a powerful drug which was given her by a druggist for labor pains, and which made her violently ill. Says it was a full term child. Has had no miscarriages.

---

[1] Mentioned in "A Clinical Report on the Use of Testicular-fluid Injections." Pearce. Amer. Surg. Bull., May 9, 1896. Also included in statistics by same author of 194 cases of tabes in relation to "Diagnosis, Etiology, and Treatment." Therapeutic Gaz., October 15, 1898.

Was married to present husband, twelve years ago—*i. e.*, in 1888—and has never been pregnant by this marriage. Has been engaged in sewing and dressmaking for thirty-five years, and during that time has worked constantly on a sewing machine.

History of Present Condition. For some years has complained of a variety of nervous symptoms, chiefly of spots of hyperæsthesia, with sensations of pain, shifting from point to point, particularly affecting the back and abdomen, and induced by the slightest draught of air.

About a year ago—*i. e.*, in the winter of 1898–99—she began to suffer with sharp pains in legs and body. Shortly after this she noticed that she tripped over objects; and this was soon followed by slight difficulty in walking.

She complains especially of these sharp pains in her legs and body, and says that they disturb her rest at night. At times she has a sensation of a band being tightly drawn about her body at the lower margin of the ribs. She says she perspires very freely, but has no night-sweats; she also suffers with bad dreams. Has experienced slight dimness of vision, and uses glasses to read.

Physical Examination. Patient is a very stout colored woman, about five feet in height; she weighs a hundred and eighty-six pounds.

There is unilateral asymmetry of the face, which consists in drooping of the right eye and flattening of the face on that side. There is also a partial double ptosis of the external oculars, though no actual paralysis. Patient says that she has never suffered with facial palsy.

The knee-jerks are lost, also to reinforcement. The plantar reflexes are gone, and there is slight retardation of tactile sensation in the soles of the feet. There are two anæsthetic patches on each breast, about the size of the palm of the hand, and involving the anterior surface and nipple region. There are, however, no true tabetic zones.

There is some inco-ordination; station with the eyes open is good, but with the eyes shut patient sways. Co-ordination of fingers is fair.

Her gait is slightly ataxic, and she walks with the help of an umbrella. She is apparently able to walk unsteadily for short distances with her eyes shut. Says she never walks in the dark. Muscular power is good. Babinski reflex is not present.

Hearing is markedly deficient to high-pitched notes, but is good for low tones. Taste and smell apparently normal.

Report on the eyes by Dr. Posey shows 5/IX vision in O. D.; 5/VI in O. S., due to far sighted astigmatism. Right pupil, 3 mm.; left, 4 mm. Irises do not react to light, but do to accommodation. No paresis of external ocular muscles. No optic atrophy, but fields of vision somewhat limited in extent for form and color.

THE CLINICAL ASPECT OF PLAGUE.

WITH ILLUSTRATIVE CASES.

BY FRANK G. CLEMOW, M.D. Edin., D.P.H. Camb.

(Concluded from page 414.)

II.

IN the first paper the appearances met with in plague in connection with the temperature, the alimentary system and the nervous system were discussed. In the present paper the remaining systems will be dealt with in the same manner.

THE CIRCULATORY SYSTEM. The pulse in the acute stages of plague is almost invariably rapid. It may rise to 110 or 120, or considerably higher, pulses of 130 or even 150 on admission being by no means uncommon. Before death it may increase to 180 or more, and become thready and quite impossible to count. It is usually very soft and compressible; the arterial walls are relaxed and the blood-pressure apparently much below the normal. In many patients the pulse is irregular, both in rhythm and in strength of beat; and in not a few it becomes intermittent at some period of the disease. The pulse may intermit for a considerable time, and the intermittency may be continued well on into the convalescence of the patient. The low arterial tension not infrequently causes a degree of dicrotism in the pulse which can easily be detected by the finger. It would seem more than probable that the disturbances of the circulation just described are in part due to the high temperatures so common in plague, and in part to the action upon the nervous system of the toxins circulating in the blood—whether upon the medullary centres, the cerebro-spinal and sympathetic nerves, or the ganglia within the heart itself. The great rapidity of the pulse is doubtless caused both by defective action of the inhibitory mechanism and by an abnormal degree of stimulation of the cardiac ganglia and the accelerating fibres of the sympathetic. The low tension of the pulse may be regarded as to some extent due to a disturbance of the vasomotor nervous mechanism, resulting in a relaxation of the muscular coats of the arteries and consequent dilatation of the vessels; and this is probably aided in the later stages by a direct action of the poisons circulating in the blood upon the muscular fibres themselves, leading to a still further relaxation and dilatation. This direct action of the toxins upon muscular fibres must also be supposed to be present in the heart itself. The extreme degree of exhaustion of the heart-muscle which characterizes the later stages of the acute period can, indeed, scarcely be explained otherwise than as the result of this direct action upon the heart-muscle, in addition to the disturbances of the nervous mechanism just described. So great is the exhaustion at this period, that if the least amount of extra work is thrown upon the heart, as by some sudden exertion on the part of the patient—and particularly by a sudden change from the horizontal to the upright position—the heart's action may fail altogether, and sudden collapse and death ensue. Gradual heart-failure, either from exhaustion of the nervous mechanism or of the muscular fibres of the heart-walls, or from both these causes, is the most usual cause of death in fatal cases of plague.

The heart-sounds in plague are always weak and muffled. Murmurs are never present, unless the patient is already the subject of some form of heart disease.

After death the heart-muscle, as a rule, shows no great sign of change, except that in many cases it is softer and more pliable than normal. There is not infrequently some dilatation of the right auricle and ventricle. The most characteristic appearances are caused by hemorrhages, which may be met with either under the pericardium or under the endocardium, forming mottled patches of reddish or purplish color and of varying size, but usually small. The blood is, as a rule, more liquid than normal.

The occurrence of hemorrhages in various parts of the body is a phenomenon of considerable frequency in plague. They give rise to appearances of very great diagnostic importance—less, however, during the life of the patient than after death. In India a considerable number of plague (and other) patients are not seen by the medical man in life, and it becomes of the utmost importance to be able to state with certainty the cause of death solely upon the post-mortem appearances. Next to the presence of a characteristic plague bubo the presence of hemorrhages is quite the most valuable diagnostic sign in a plague cadaver. In the living patient the internal hemorrhages give no certain sign of their occurrence, while external hemorrhages are comparatively rare and not, as a rule, serious. In this respect the present epidemic in India would appear to differ from most of the older epidemics of plague in the west Almost without exception the older writers upon plague dwell upon the occurrence of petechiæ and of hemorrhage from the nose, lungs, bowels, and kidneys. The black spots of the earlier epidemics and the "tokens" of the later ones, which were regarded as the most important diagnostic sign of the disease, appear to have been nothing else than subcutaneous hemorrhages or petechiæ. It is a remarkable fact, therefore, to which attention should be called, that in the present epidemic in India external hemorrhages have been not the rule, but comparatively rare exceptions. So far as my own experience goes, both in Bombay and in Calcutta, out of the many hundreds of cases I have examined, the appearance of petechiæ was present in two only. They gave the skin a dusky, mottled look, and, owing to the natural color of a native skin, it was not easy to be certain that they were truly petechiæ. Hemorrhages from the lungs, bowels and kidneys were also of rare occurrence. Thus out of 502 patients admitted to the Parel Hospital, Bombay, hæmatemesis occurred in three cases only; blood was not observed in the stools in a single case; hæmoptysis was present in three and hæmaturia in three. In none of these instances was the amount of blood passed at all large or in itself a cause of death. In a few cases epistaxis occurred, but never to an alarming or fatal extent.

Deeper hemorrhages, on the other hand, around buboes and under serous and mucous membranes are extremely common, if not invariable accompaniments of the disease. The largest are those which occur around a bubo. On making an incision over a plague bubo which has not gone on to suppuration, the subcutaneous tissue and the deeper tissues around and below the glands themselves are almost invariably to some extent blood-stained The gland is usually embedded in a more or less extensive infiltration, often of a glistening and peculiarly gelatinous character, which may be merely pink from the presence in it of a small quantity of extravasated blood or blood-pigment, or which may be nothing more nor less than unmixed extravasated blood itself. These hemorrhages may pass a considerable distance in all directions around the inflamed gland; they may sometimes be traced up and down the course of an adjacent vessel. Thus in the case of an inguinal bubo, in which the deeper iliac glands are frequently enlarged in addition to the superficial inguinal glands, hemorrhages may be seen dipping down into the pelvis and following the course of the external iliac artery. Similarly, in a femoral bubo, the extravasated blood may be traced some distance down the course of the femoral artery. Occasionally, minute hemorrhages are seen in the intima of the artery itself. Hemorrhages of minute or of larger size may also be seen in the substance of the glands themselves when these are cut across.

On serous and mucous membranes hemorrhages are of very common occurrence in plague cadavers. They may be met with at almost any part of the parietal or visceral layers of the peritoneum, pericardium and pleura. The commonest position for them is at the lines of reflection of these membranes, particularly where they form the so-called ligaments, such as the falciform ligament of the liver or the broad ligaments of the uterus. They give rise to a very characteristic red or purplish mottling, generally made up of a large number of discrete hemorrhages. Each hemorrhagic patch varies in size from that of a hemp-seed to that of a sixpence; larger patches than this seem to be the result of the confluence of two or more small ones, and may consequently be very irregular in outline. Mottled patches of this kind are occasionally met with in large numbers in one and the same body, involving the serous covering of every internal organ and the mucous lining of every hollow organ. In other cases they may be very few in number, and confined to perhaps a single patch on the liver or kidney; while in a few cases they are absent altogether.

Hemorrhages into the substance of solid organs may also be met with, but they are less common than those just described. They are usually punctate in character, appearing as small red spots when the organ is cut into. I have never seen hemorrhages larger than this in the substance of solid organs, except in the case of the gland or glands which form the bubo. Punctate hemorrhages I have seen in the liver, kidney, ovary and Fallopian tubes.

It has been necessary to digress thus far into the pathology of plague, as the hemorrhages here described, while an essential part of the disease, and one to which reference could not be omitted altogether, are primarily of pathological importance. They lend little to the clinical picture of the disease, except in those comparatively rare cases where the blood escapes into the stomach, or the respiratory or urinary passages, and gives rise to hæmatemesis, hæmoptysis or hæmaturia. They are not, however, altogether without clinical import. They appear to indicate a profound change either in the blood or the bloodvessels, or the relation between the two which allows of the escape of blood from the latter, a change which is very probably analogous or allied to that which occurs in pernicious anæmia.

In one instance, and in one only, an oozing of blood occurred from the gums, which became soft and spongy as in scurvy. This symptom appeared within less than twenty-four hours of death; it was not accompanied by visible hemorrhage elsewhere, and a post-mortem examination could not be obtained. The case was quoted in the first paper (Case XI.).

THE RESPIRATORY SYSTEM. Very few cases of plague escape without some affection, however slight, of the respiratory system. In all cases during the acute period the respiration is, as might be expected, more rapid than normal; it is occasionally shallow and sometimes irregular. But the respiratory disturbance is rarely confined solely to these conditions, which may be regarded as simply febrile phenomena, and in most cases there is evidence of catarrhal or inflammatory involvement of the respiratory passages. On examining the chest of a plague patient it is extremely common to find rhonchi of various characters in some part of one or both lungs. They are more frequently present behind than in front. They may or may not be accompanied by a small amount of mucous expectoration. Not infrequently loud, moist sounds are heard, indicating the presence of fluid, whether bronchitic or œdematous, in the air-passages. Occasionally a true acute bronchitis is present, with scanty or profuse mucous, mucopurulent, or purulent expectoration. If the patient survives more than the first three or four days of the illness, some degree of hypostatic congestion is very frequently present, and in not a few there may be a very considerable amount of œdema.

In one case, which ended fatally, the disease was complicated by an acute pleurisy with effusion on the left side, without apparent involvement of the lung itself. Some degree of pleuritic inflammation is frequently met with in cases complicated with bronchitis or pneumonia. It is probably present in many cases without being detected in life, and on the post-mortem table it is far from uncommon to find light adhesions over some part of the lung surface, particularly if there is any inflammatory involvement of the lung tissue itself, in cases in which there had been no suspicion of pleurisy during life.

Hæmoptysis was noted as present in two cases only out of the 502 cases admitted to the Parel Hospital. In each case there was secondary pneumonia, and the hæmoptysis was limited to the presence of a small quantity of bright, fresh blood in the sputum before it assumed the pneumonic character.

In this same group of 502 cases secondary pneumonia developed in seventeen cases. It varied greatly in extent and severity from a single small patch of dulness with tubular breathing up to the consolidation of an entire lobe of one or both lungs. The onset was in each case rather insidious than sudden. The temperature rose and the pulse and respiration became more rapid. The sputum, which in most cases had been present before pneumonia set in, and had been of a mucous or mucopurulent character, became streaked with rusty blood and gradually assumed the appearance of pneumonic sputum. In such cases the sputum presented to the naked eye no divergence from that of ordinary croupous pneumonia; it was of a reddish-brown color, more or less tenacious in consistency, and was occasionally streaked with fresh red blood, which, in all probability, came from the pharynx or upper part of the respiratory passages. On examining the chest the physical signs of pneumonia were invariably discovered at some part of one or both lungs. In some cases more than one patch of consolidation was present. Occasionally the localized pneumonia is accompanied by a considerable degree of inflammation of the adjacent pleura, which may give rise to much pain and loud friction sounds, or may lead to effusion of a considerable quantity of fluid, and in either of these conditions the pneumonic signs may be to a considerable extent masked. But in such cases the appearance of the patient, the raised temperature, rapid pulse and respiration, the working of the alæ nasi, and the character of the sputum will generally enable a correct diagnosis to be arrived at. If at all extensive the development of secondary pneumonia greatly lessens the chances of the patient's recovery. But if confined to a single small patch it need not of necessity be regarded as gravely affecting the prognosis; and of the seventeen cases just mentioned as many as five recovered, the condition of the lung completely clearing as convalescence progressed.

Primary plague pneumonia occurred in twelve cases of the group of 502 cases so frequently referred to above. It is quite possible that this does not represent the true proportion of cases in which the disease assumed this form. A certain number of patients were either found dead on admission or died shortly after admission and before a thorough examination of them could be made. Several of such patients had no buboes, and it is possible that some of them had died from the pneumonic form of the disease. In each of the twelve cases in which the diagnosis was certain there were no buboes. The other prominent symptoms of plague—the injection of the conjunctivæ, the coating of the tongue, the delirium and other nervous symptoms, the high temperature, rapid, weak pulse and the hot, dry skin—differed in no way from these symptoms as they are present in the more common bubonic form of the disease. But in all the patients there were prominent and characteristic symptoms which indicated, first, that there was some serious lung affection, and, second, that the illness was from the beginning one of a very grave character. The history in such cases was usually one of rapid onset, of rigors, high fever, difficulty in breathing, great prostration, and more or less cough and expectoration. On admission the temperature was usually very high, in many cases above 104° and in some above 105°. There was generally dyspnœa; in some cyanosis was present; in seven cases there was marked working of the alæ nasi. The cough was usually not very troublesome and the sputum was scanty. In some cases the sputum was more watery than that of ordinary croupous pneumonia, but in others it was distinctly tenacious, and appeared to differ in no respect from that of croupous pneumonia or of the secondary pneumonia of plague above described. The physical signs in these cases are those of one or more patches of pneumonic consolidation. Over the rest of the lung the respiratory sounds are usually accompanied by moist, bronchitic sounds.

The post-mortem appearances of the lung in such cases are very characteristic. There is usually some degree of pleurisy and an abnormal amount of fluid, which is often blood-stained, is present in the pleural cavities. The parietal and visceral layers of the pleura may show the mottled hemorrhages already described. On cutting into the lung the tissue between the pneumonic patches is generally deeply congested. Much bloody fluid, more or less frothy in character and occasionally containing a small quantity of pus, can be squeezed out of the lung. This part of the lung is generally crepitant, and appears to be in the condition of bronchial and vesicular catarrh, accompanied by a considerable degree of congestion and sometimes of œdema. But the most characteristic appearances met with in the lung are those of the pneumonic patches. They may be single, or more often multiple, and vary in size from that of a pea up to large patches affecting a considerable portion of a lobe. They appear to be raised above the rest of the pleural surface, and usually differ somewhat in color from the non-pneumonic portion of the lung. On section the patch is sometimes seen to be distinctly triangular in shape, and a patch of this kind bears the closest possible resemblance to an embolic infarct. The larger patches are usually irregular in outline, and would appear to be, in many instances, due to the coalescence of two or more smaller patches. The patches are entirely devoid of air, and are, therefore, not crepitant; what little fluid can be pressed out of them is not frothy, and, if cut out, these portions of consolidated lung will be found to sink in water. The glands at the hilum of the lung are occasionally, but not invariably, somewhat larger than normal.

The pneumonic form of plague is in most epidemics the more fatal form of the disease. Of the twelve cases above referred to, however, two were fortunate enough to recover, though one of them had been very seriously ill, with a temperature over 105° and much delirium and prostration.

This form of plague is also usually regarded as the most infectious form of the disease; but, fortunately, the infection was not transmitted to any of the attendants from a single case. One hospital assistant wounded his finger in making a post-mortem examination upon one of the pneumonic cases; but he developed the bubonic form of plague, and not the pneumonic. An *ayah*, ward-boy, *mehter* (or sweeper), and a gardener employed in the compound of the hospital all coutracted the disease, but they also suffered from the bubonic and not the pneumonic form.

THE GENITO-URINARY SYSTEM. In the acute stages of plague the urine has the characters common to all febrile urines—that is to say, it is deficient in quantity and more or less high-colored. As a rule, unless there is some degree of nephritis, the diminution in the quantity of urine is not very marked. A high degree of acidity is often met with in the urine of plague patients. Albuminuria is very commonly present, though not, as some writers have stated, universally so. Thus out of a group of seventy-five cases in which systematic notes were made of the condition of the urine, albumin was entirely absent throughout the illness in seventeen (or 22.7 per cent. of the whole group). It was present in the other fifty-eight cases. The degree of albuminuria varied greatly, from the merest trace of albumin up to an amount so great that the urine became almost solid on boiling. This symptom, in common with so many other of the symptoms of plague, underwent marked and more or less rapid changes. A patient's urine which contained a considerable quantity of albumin one day would be quite free from it on the next or even on the afternoon of the same day, and *vice versa.* In some patients the albumin would appear, disappear, and reappear several times over in the course of the disease.

In a small number of patients the urine was found to contain a deposit of tube-casts, epithelia, and débris, indicating the presence of nephritis. The urine in such cases was high-colored and very scanty, and contained a large proportion of albumin and some blood. Complete suppression of urine did not occur in a single case, though in the nephritic cases the amount of urine was reduced to a very small quantity. In these cases the drowsiness, passing on into coma, so commonly present in plague, was unusually marked, and was doubtless in part due to the uræmic condition.

The passage of blood in the urine, apart from nephritis, is, in my experience, a rare occurrence in plague, and I have never seen it occur in an excessive degree. In two patients only was hæmaturia present without the urine containing tube-casts and other elements indicative of nephritis. Both patients were Hindoo male adults. Each had a left inguinal bubo. In one the temperature rose to 106° before death, and the urine contained a large quantity of albumin in addition to the blood. In the other case albumin was also present in a large amount, and in this case the blood and albumin continued to be present in the urine up to the time of the patient's death, on the third day after admission. In neither of these two cases did hemorrhage occur elsewhere.

In the following case the urine contained blood which apparently came from the bladder:

Case XII. (Register No. 935).—Mohammedan male, aged thirty-five years. The man was a confirmed opium eater; he had suffered from repeated attacks of malarial fever, and had in consequence a much enlarged spleen. He passed through an attack of plague of no great severity, accompanied by a bubo in the left femoral region, which did not suppurate, by a good deal of delirium, and by the presence on one day only of a light cloud of albumin in the urine. During convalescence (on the fourth day after his removal to the convalescent ward) the urine was found to contain blood in considerable quantity. I was away on sick leave at the time, and when I saw the patient, five days after the appearance of the blood in the urine, he was suffering from acute cystitis, with much pain and tenderness and frequency of micturition, and passing urine which was alkaline, and gave a thick deposit, made up of phosphates, red blood-corpuscles in large numbers, a few leucocytes, some irregular, flat epithelial scales with nuclei, and many very actively moving micrococci and rod-shaped bacilli. There were no tube-casts. The condition easily yielded to treatment, and two days later the urine was normal, save for the presence of a small number of red blood-corpuscles. The patient recovered.

Retention of urine is very common in plague. It has already been mentioned in discussing the symptoms connected with the nervous system.

Four women were admitted in the pregnant state, and all died. Three aborted before death—one at the fifth, one at the sixth month, and one at a period not noted. The fourth patient, who was pregnant four months, died without aborting, but the presence of an offensive vaginal discharge in her case probably indicated the death of the fœtus. The patient in this case was a young Hindoo, aged twenty years; she was stated to have been ill for fifteen days before admission, but the history of duration of illness in native patients must always be accepted with caution. She died on the fourth day after admission, without abortion occurring. Her temperature rose to 106.8° before death.

Four other women menstruated during the course of their illness—three died and one recovered.

THE HÆMOPŒIETIC SYSTEM. The *spleen* in plague patients is occasionally slightly enlarged ; but it is rather important to point out that an enlarged spleen is in no sense whatever a necessary diagnostic sign of the disease. There would appear to be a somewhat general impression that enlargement of the spleen is an invariable accompaniment of plague, and that in its absence considerable hesitation is necessary in pronouncing a given case to be one of this disease. It will be recalled that in the case of Barisch, the laboratory assistant who developed plague in Vienna last autumn and who was treated in Prof. Nothnagel's clinic, both Prof. Nothnagel and Dr. Müller (who himself, unfortunately, succumbed to the disease later) "discountenanced the diagnosis of plague, as there was no enlargement of the spleen."[1] So far as my experience of the disease is concerned, enlargement of the spleen could be detected in only a small proportion of the cases. It is common to find the spleen after death from plague much congested and slightly larger than normal ; but cases in which the degree of enlargement was sufficiently great to allow of its detection in life were comparatively few.

It has also to be remembered that native plague patients in India have, almost without exception, suffered at some period from an attack, or from repeated attacks, of some form of remittent or malarial fever ; and that, therefore, in a considerable proportion of those patients in whom the spleen was enlarged the enlargement was in great part, if not entirely, due to this cause and not to the action of the plague virus. In a few patients of this kind I have met with spleens of immense size.

The spleen in uncomplicated plague cases usually has the appearances characteristic of that organ after death from acute febrile diseases. It is slightly swollen, full of blood, and frequently softened and more pulpy and friable than normal. But this is not invariably the case, and I have found the spleen in plague cadavers distinctly more hard and firm than normal. Hemorrhages under the capsule are not uncommon. In malarial subjects the spleen presents the appearances characteristic of ague-spleen.

---

[1] Lancet, October 29, 1898.

The enlargement of one or more *lymphatic glands*, constituting a bubo or buboes, is, of course, one of the most frequent, and from a diagnostic point of view, most important of the signs of plague. It is absent in the primarily pneumonic form of the disease and also in a small number of other cases; but in my experience in non-pneumonic plague patients a bubo develops sooner or later in over 90 per cent. of the cases.

The gland or glands affected become swollen and tender, and there is practically no other constant character about them. The tenderness is, for diagnostic purposes, the more important feature of the two. In many plague patients, just as in patients suffering from any other disease, palpably enlarged glands may be met with, due to venereal disease or to some other known or unknown cause. It is sometimes a matter of considerable difficulty to determine whether a given swelling is truly a plague bubo or merely an old or chronic swelling due to one of these other causes. As there are many other febrile diseases which in their early stages closely resemble plague, the point becomes one of very great importance in the differential diagnosis of the malady. It is fortunate, therefore, that there is one character—namely, tenderness on pressure—which is almost invariably present in plague buboes, while it is almost invariably absent in chronic swellings due to other causes. The tenderness of a plague bubo is often excessive, the least touch of the skin over the swelling causing the patient to shrink and show signs of extreme pain. There is usually also a considerable amount of pain, apart from pressure, in a bubo. Pain or tenderness, or both, are generally very early symptoms, and often precede the swelling of the gland.

The other characteristics of a plague bubo vary almost infinitely. The skin over it may be somewhat reddened, but this is not usually the case. The skin may or may not be adherent to the gland beneath. There may be a great degree of surrounding infiltration masking the outline of the gland or glands enlarged. The swelling caused by the enlarged glands and the infiltration around varies greatly in size, shape, and consistency. It may be of almost any size—from that of a small potato up to the size of a fœtal head. Cervical buboes, in particular, sometimes develop into immense tumors, occupying both triangles of the neck and nearly filling up the angle between the neck and the shoulders. Large buboes of this kind are apt to be surrounded by a great degree of infiltration, which may extend for a considerable distance in all directions, both around and beneath the gland. In such cases the gland and infiltration around it may form a tumor of a peculiarly diffused character, and it may be impossible to define its limits or to tell where the infiltration ends and the healthy tissues begin. A diffuse swelling of this kind is frequently hard and brawny in character; occasionally it is soft and boggy, and pits on pressure. After death the infiltration around a bubo appears to be of the nature of an inflammatory exudation; it has frequently a peculiarly gelatinous and glistening appearance, and contains much œdematous fluid, while in the large majority of cases it contains extravasated blood. The varying appearances of the hemorrhages around buboes were mentioned in discussing the circulatory system. Occasionally the infiltration around a bubo does not appear to be in any sense of an inflammatory character, but to consist entirely of extravasated blood.

In not a few cases there appears to be no infiltration of any kind around the bubo; the swelling is markedly hard and prominent, and the gland or glands can be felt and clearly outlined by the fingers; the skin in such cases sometimes appears peculiarly thin over the bubo, and the fingers may almost receive the impression that they are touching the very gland itself, with but the thinnest of coverings intervening between them and it.

Buboes are, as a rule, among the early manifestations of plague. Tenderness or swelling of a gland may be detected by the patient at the very onset of the disease, and in a few cases the patient will state that these symptoms were noted some time before the "initial" rigor and headache came on. In most bubonic cases the bubo appears within the first two or three days of illness; but this is not invariably the case, and in a few cases the appearance of the bubo is considerably delayed. In one patient under my care there was no sign of a bubo until the twelfth day after admission to the hospital, and in another the bubo only appeared on the fifteenth day. It is impossible to state with accuracy what days of the illness these represented, as the history of the disease obtainable from native plague patients or their friends is most unreliable. But if in these two cases the history obtained was correct, the dates of appearance of the buboes were the seventeenth and twenty-fourth days of the disease, respectively. The following are notes of four cases (including the two just mentioned) in which there was marked delay in the appearance of the primary bubo:

TABLE II.—EXAMPLES OF LATE APPEARANCE OF THE PRIMARY BUBO

Register number.	Religion.	Sex.	Age.	Previous duration of illness in days.	Date of admission to hospital.	Date of appearance of primary bubo.	Position of bubo.	Number of days after admission when bubo appeared.	Day of illness when bubo appeared (approximate).	Result.
647	Hindoo	M.	30	2	Feb. 20	Feb. 28	Left popliteal.	8	10th.	Cured.
768	Hindoo	M.	30	9	Mar. 3	Mar.18	Right axilla.	15	24th.	Cured.
871	Christian	M.	46	3	Mar.15	Mar.20	Submental.	5	8th.	Died, Mar.21
1049	Hindoo	F.	35	7	Apr.11	Apr.17	Left groin.	6	13th.	Cured.

In patients who develop more than one bubo, the secondary bubo or buboes may appear at almost any period of the illness and at almost any interval after the appearance of the primary bubo. The following are some examples of late development of secondary buboes. In each case a primary bubo, in the position noted, was present when the patient was admitted, and the secondary buboes developed after the intervals noted in the table:

TABLE III.—EXAMPLES OF LATE APPEARANCE OF SECONDARY BUBOES.

Register number.	Religion.	Sex.	Age.	Previous duration of illness in days.	Date of admission to hospital.	Position of primary bubo.	Position of secondary buboes.	No. of days after admission when secondary buboes appeared.	Day of illness when secondary buboes appeared (approximate).	Result and remarks.
638	Hindoo	M.	12	8	Feb. 19	Left axilla.	Sub-mental.	10	18th	Died, Mar. 1. Pleurisy and secondary pneumonia developed.
651	Christian.	M.	25	3	Feb. 21	Left axilla.	Left cervical.	3	6th	Died, Mar. 20. Erysipelas had set in on Mar. 16.
							Left groin.	3	6th	
							Right groin.	6	9th	
							Right cervical.	6	9th	
							Sub-mental.	20	23d	
741	Hindoo	M.	22	2	Mar. 2	Left axilla.	Left groin.	6	8th	Recovered.
							Right axilla.	8	10th	
							Right cervical.	9	11th	
							Left supra-trochlear	22	24th	
812	Hindoo	M.	21	3	Mar. 6	Right groin.	Right cervical.	10	13th	Died, Mar. 24. (Vide Case XI. in the first article.)
1118	Christian (Goanese).	M.	1½	2	Apr. 18	Left axilla.	Right femoral.	6	8th	Recovered after diffuse suppuration spreading down left upper arm
1140	Hindoo	F.	20	6	Apr. 22	Left groin.	Right and left cervical.	8	14th	Recovered.

The latest appearance of a bubo in any of the above cases was, it will be noted, on the twenty-second day after admission to the hospital; or, if the history was trustworthy, on the twenty-fourth day of the disease. The late development of a bubo, whether primary or secondary, is, like all late phenomena in the disease, a far from unfavorable sign. It implies that the patient has already survived the earlier stages, and after the fourth or fifth day of an attack of plague every day survived lends stronger hope for the recovery of the patient.

In the majority of bubonic cases of plague which end in recovery the bubo suppurates. The character of the pus formed varies very greatly, both in quantity and appearance. Most often it is rather thick and contains sloughy and caseous fragments, and is not infrequently stained with blood. Sometimes it is thin and sanious in character. A not uncommon occurrence is the formation and discharge of a superficial collection of thin, sanious matter, apparently in the subcutaneous tissue over the gland, followed after an interval by the discharge of thick pus from the breaking down of the gland itself.

A not very rare sequel to a bubo is the formation of a deep slough, involving the whole bubo and the skin over it. A favorite position for this to occur is in buboes situated just below Poupart's ligament, at the base of Scarpa's triangle. The skin and gland or glands come away together as one deep, ragged, blackened slough. The slough usually takes three or four days or longer to separate. The cavity left behind may be four or five inches in diameter, and so deep that the vessels and fascia forming the floor of the triangle may be exposed. Usually the cavity has extremely ragged edges and floor; the edges may be considerably undermined. A good deal of dirty-looking pus lines the cavity. Such cavities usually heal; granulations slowly form, and the healing process is extremely gradual. In cases of this kind there is obvious risk of sloughing of the vessel walls, and dangerous and even fatal hemorrhage has been reported as occurring in more than one case. Fortunately, this did not happen in any of the cases under my care. This termination of a bubo in the formation and separation of a deep slough is not altogether an unfavorable sign, if only from the fact that it is usually a somewhat late phenomenon, and implies that the patient has survived the most dangerous stage of the disease. It causes, it is almost unnecessary to add, a considerable drain upon the patient's strength, particularly if, as sometimes happens, there is more than one sloughing bubo and other local lesions are present at the same time. But stimulant and nourishing treatment and appropriate local applications to hasten the separation of the slough and the healing of the cavity will usually lead to the recovery of the patient.

Buboes may occur in almost any situation in which there are lymphatic glands. The groin is, in my experience, the commonest position. Thus, out of 446 patients with buboes the primary bubo was in the groin in 268, or 60 per cent. of the total. The axilla was the next most frequent position (82 cases, or 18.3 per cent. of the total), and the neck occupied the third place in order of frequency, with 42 cases, or 9.4 per cent. of the total. The supratrochlear gland was primarily enlarged only in three cases, and the popliteal in two cases only; curiously enough, in each of these five cases the bubo, whether supratrochlear or popliteal, was on the left side of the body. The submental gland was the site of the primary bubo in two cases. The position of the bubo is apparently not without influence upon the result of the disease. Cases with cervical or submental buboes have, in my experience, proved more fatal than others, and this is borne out by the evidence of other observers. Thus, of the 44 cases of this kind mentioned above, 37, or 84.1 per cent., died. Cases with axillary buboes occupied the second place in order of fatality, with a death-rate of 82.7 per cent. They were followed by cases with buboes in the groin (whether inguinal or femoral), in which the mortality was 80.1 per cent.; while among patients with multiple buboes the mortality was 79.2 per cent.

The figures here dealt with are somewhat small as a basis for general conclusions; but, so far as they go, they fully support the conclusions drawn from similar figures obtained from the experience of other hospitals, both in Bombay and elsewhere. It may now, indeed, be regarded as an established fact that cases of plague with cervical buboes are the most fatal; that those with axillary buboes come second, and those with groin buboes third; while those with multiple buboes are the least fatal. The explanation of the somewhat lower mortality of cases with multiple buboes has already been briefly referred to, the fact that there are several buboes in a given case implying that the patient has survived the first and most fatal period of the disease. The explanation of the higher mortality of cases with cervical and axillary buboes over those with groin buboes is not quite so obvious. It has been suggested that this higher mortality may be due to the greater proximity of buboes in the upper parts of the body, and particularly in the neck, to the brain centres, which may consequently be supposed to receive a larger quantity of toxins than when the bubo is at a greater distance. This explanation may very possibly be either entirely or in part correct; but it has seemed to me, in many cases at least, that the high mortality among patients with cervical buboes has been due to the excessively large size which buboes in this position may attain. Whether as the result of the loose nature of the tissues in the neck, which allows of a greater enlargement of glands in this position, or whether due to some peculiarity of the cervical glands themselves, which leads them to react more to the influence of the plague bacillus, there can be no question that glands in this position do attain a much greater size in plague than glands elsewhere. The exact relationship between the size of a bubo and the severity of an attack is not so entirely a simple matter as it would at first sight seem; but it would appear that in patients who survive long enough for the bubo to attain its full development the larger the bubo the more severe is the attack and the worse the prognosis. It is not known to what extent the degree of enlargement of a gland corresponds to the quantity of toxins produced or to their degree of virulence. But it may, *à priori,* be assumed that, other things being equal, a large bubo will be capable of producing a greater quantity of toxins than a small one.

Very many patients die, in the course of the first few days of the illness, without the primary bubo attaining any great size; and such cases may be provisionally explained as due to the production in the bubo of toxins, not in large quantity, but of a high degree of virulence. In patients, on the other hand, who survive long enough for the bubo to attain its full development, the fact that the fatality of an attack of plague does bear a distinct relation to the size of the bubo can be best explained by supposing that the quantity of toxins produced varies with the size of the bubo. The greater size which cervical buboes may attain may consequently be regarded, with considerable probability, as in part the explanation of the higher mortality among patients with buboes in this position. An additional explanation is also found in the great importance to life of the structures in the neighborhood of cervical buboes. The larynx and trachea may be seriously pressed upon by the enlarged glands, or the surrounding œdema may extend to and invade these structures and cause dangerous and even fatal obstruction to the breathing. Swallowing, too, may be rendered almost or entirely impossible, and it may become a matter of extreme difficulty or impossibility to administer any nourishment by the mouth. All these conditions lessen the patient's chances of recovery.

To a less extent the argument just brought forward as to the relation between the size of the bubo and the severity of the attack in plague may also apply to cases with axillary buboes. Buboes in this position occasionally attain a very large size—larger than they ever attain in the groin—and this, in addition to the greater proximity of axillary buboes to the most vital organs, may be held to explain the somewhat higher mortality among patients with axillary than among those with inguinal buboes.

The relative mortality among cases in which the bubo is respectively on the right side or on the left side of the body may be referred to more as a matter of curious interest than as one having any very direct bearing on the many unsolved questions connected with plague. Among my own cases the mortality in patients with left-sided buboes was 83.5 per cent., and in those with right-sided buboes, 78.7 per cent. The difference is appreciable; but it can scarcely be regarded as anything more than accidental. Not only is there no obvious reason why one side of the body should be a more unfavorable site for a bubo than the other, but the experience just quoted has been exactly reversed elsewhere. This was notably the case in the very same hospital in the previous year's epidemic, when the mortality among patients with right-sided buboes was considerably higher than among those with left-sided.[1]

There were 48 cases with multiple buboes. In 36 of these the buboes were in two positions, and in 8 of these (7 of whom, or 87.5 per cent., died) they were confined to the right side of the body; in 3 (all of whom died) they were confined to the left side; and in 25 (20 of whom, or 80 per cent., died) they were present on both sides. In 12 patients there were buboes in three or more positions, and of these 9, or 75 per cent., died.

It may be noted that every case in which the submental gland was enlarged, whether primarily (in two cases) or secondarily (in five cases), proved fatal.

Other Local Lesions in Plague. Apart from the buboes the external local manifestations of plague are of considerable variety, though a somewhat unnecessary degree of complexity has, I think, been given to them by some writers. The most important of these lesions can, in my experience, always be grouped under one of three headings: They are either collections of matter, or patches of necrosed skin, or blebs of watery fluid.

The collections of matter vary greatly in character and site. They may occur in almost any part of the body. The smaller ones have the characteristics either of a furuncle or of a pemphigoid bulla. Crops of boils or crops of bullæ may continue to appear for a long period after the acute symptoms of plague have passed off. They are most usually met with in patients who have had a very severe attack of the disease, and particularly in cases where the mental and other symptoms indicative of affection of the nervous system have been marked, and where the attack has left the patient in a more than usually weak and exhausted condition. I examined the contents of the boil or bulla in several instances, but never succeeded in obtaining the plague bacillus from them; while, on the other hand, pyogenic organisms were generally present in large numbers. The most probable explanation of their occurrence is, it seems to me, to be found in a lowered state of tissue nutrition, possibly accompanied by a lessened activity of phagocytes and a diminution in the quantity or quality of the alexins or protecting bodies, which allows of the entrance and multiplication of specific pyogenic organisms. If this is truly the explanation of these lesions they must be regarded as complications rather than as symptoms of plague. The contents are always purulent; but the pus varies in character. When the collection has the characters of a boil the pus is sometimes thick and contains caseous and sloughy fragments, and may be mixed with blood; occasionally, but not very commonly, there is a hard central core, which separates as a slough. When, on the other hand, the collection has the characters of a bulla, the pus is often thin and serous, and the lesion closely resembles a bulla of pemphigus. There is always a greater or less degree of inflammatory areola around, and frequently a good deal of induration. When the pus escapes, either naturally or as the result of an incision, a small, ragged ulcer is left, which is slow in healing and leaves a permanent scar.

---

[1] Report on the Bubonic Plague in Bombay, by Brigadier-General W. F. Gatacre, C.B., D.S O. Bombay, 1897, p. 53. Report of the Parel Hospital, by Surgeon-Captain Thompson, I.M.S. Out of 304 cases, those with buboes on the *right* side gave a mortality of 66.7 per cent., and those with buboes on the *left* side only 58.3 per cent.

Occasionally a local collection of pus attains a very large size, and then it has the characters neither of a boil nor of a pemphigoid bulla, but of a large, superficial abscess. None of these lesions appears to me to be truly pyæmic. Were they of this nature abscesses would occur not only externally, but in the internal organs as well; and this I have not observed in a single case.

The second group of localized lesions take the form of patches of necrosis of the skin. In very many instances they are entirely artificial, as the result of the application, by the patient or his friends, of some irritant or caustic. In at least two-thirds of the cases of plague admitted to an Indian hospital it will be found that applications of this nature have been made, either over the bubo or elsewhere. They generally lead to destruction of the epidermis, but rarely affect the true skin to any depth; but patches of necrosed skin from other causes are also met with. They often develop remarkably rapidly, and the first stages may be easily missed. They appear to begin with a blackening and drying up of both the epidermis and the true skin, which come away as a thin slough, and leave a shallow, granulating plaque, which is slow to heal. They vary in size from that of a sixpence to that of the palm of the hand. When patches of this nature occur in positions liable to pressure, such as over the occipital protuberance, the sacrum, or the heel, it is reasonable to suppose that the pressure has been a factor in their production. In such cases they may be regarded as, and indeed have all the characters of, bed-sores; but they also appear not infrequently in positions not liable to pressure, and the most probable explanation of their occurrence here (as also, to some extent, of their occurrence in positions exposed to pressure) is that they are trophic lesions, due to a disturbance of that portion of the nervous system which controls and regulates the nutrition of the skin.

The third form of local lesion is a bleb or blebs which are occasionally found on some portion of the limbs of a patient suffering from plague. Between the fingers or between the toes is a favorite position for the appearance of blebs. They contain a small quantity of watery fluid with which a little pus may be mixed. They are extremely superficial, their outer wall appearing to consist of the raised epidermis only;

there is usually little or no inflammatory reaction around them. Most observers have regarded a bleb of this character as indicating the site of entrance of the plague bacillus. This view is a very tempting one; but, unfortunately, there are considerations of much cogency against its immediate and unqualified acceptance. Thus, in those cases of plague in man, where the site of inoculation is known, as in plague contracted by means of a wound received at a post-mortem examination, there is no reaction or formation of blebs at the site of entrance of the poison. The same is true where plague is artificially inoculated into rats or guinea-pigs in the laboratory. Moreover, blebs of this kind are not always an initial or a very early symptom, and I have seen them appear many days after the admission of a patient to the hospital and long after the other symptoms were fully developed. If they are in truth local reactions at the site of entrance of the plague bacillus it is at least remarkable that they are such comparatively rare phenomena, and that in some cases there are two or more such blebs present in the same individual.

In no instance have I seen the occurrence of anything in the nature of an exanthematous eruption in cases of plague. In one patient an urticarial rash appeared; but as this patient was one of fifty submitted to the injection of a serum for which curative powers were claimed,[1] the rash was almost certainly due to the action of the serum, and was not a manifestation of plague.

Conclusion. However desirable it might be to sum up in a few brief sentences the main characteristics of the disease, of which the clinical description here given, long though it be, is still far from complete, I have no intention of attempting to do so. The task would, indeed, prove an impossible one. No true conception of the nature of plague can be obtained without bearing in mind all the manifold phenomena which the disease gives rise to in every system and tissue of the body, and without remembering that these phenomena vary greatly, not only in different individuals, but in the same individual at different times. No other acute zymotic disease appears to cause such profound and wide-spread disturbance of function and even of structure, and few other diseases are so protean in character as plague, not only in its clinical manifestations, but also in its epidemiological behavior. The remarkable differences between the clinical pictures which may be presented by two given patients suffering from plague, or by the same patient on two successive days, find their exact analogue in the marked differences in the rapidity of spread, mortality, proportion of persons attacked, relation to climate, soil, altitude, and other concomitant conditions—in a word, in the epidemiological characters which may be presented by two given outbreaks of the disease.

---

[1] Lancet, May 6, 1899. "The Serum Treatment of Plague," by the author.

But in endeavoring to account for these differences the analogy between the two sets of phenomena to a great extent ceases to hold. As regards the behavior of the disease, as a whole, the greatest difficulty is met with in endeavoring to account for the very varying characters of different epidemics. To quote a single example, the recent severe recrudescence of the disease in Poona, in the middle of the monsoon, is entirely contrary to the behavior of the disease in previous years, whether in Poona or any other part of India. As regards the clinical phenomena of plague, on the other hand, a proximate explanation can, at least in many instances, be found for the varying features which the disease presents. The disease is unquestionably intimately connected with, if not solely caused by, the entrance into the body of a specific bacillus, and the subsequent production of specific toxins, which, circulating through the tissues, produce the varied general and local symptoms. The toxins appear to have an early and special action upon the brain and nervous structures through the body. There is also reason to suppose that muscle, glandular structures, and, perhaps, all other tissues in the organism, are to some extent affected directly by the action of the toxins circulating through them.

It is not always easy to determine to what extent each of these two modes of action of the toxins—indirectly through the nervous system or directly on the structures and tissues themselves—is to be credited in producing the effect. But there would appear to me to be little doubt that the toxins of plague are primarily nerve poisons, and that the affections of other organs or tissues met with in plague are to a very great extent, and, perhaps, to a greater extent than is usually thought, due to the profound disturbance of the nervous mechanism which controls their action or nutrition, or both.

A CRITICAL SUMMARY OF THE LITERATURE
ON THE
SURGERY OF THE STOMACH.

By Charles H. Frazier, M.D.,
OF PHILADELPHIA.

Such has been the activity of surgeons in this field that the reviewer can restrict his observations to the literature of the past year and yet find much that is worthy of attention. Of the many interesting features of the surgery of the stomach in this period especially noteworthy is the rapidly increasing popularity of operations, the object of which is to establish communication between the stomach and intestine, over those which deal directly with the lesion of the pylorus. Discouraged perhaps with the results obtained from operative intervention upon the pylorus itself, or encouraged probably by the pleasing results following the anastomotic operation, where an attack upon the pylorus itself has been clearly contraindicated, whatever be the motive, surgeons are at all events discarding such operations as pyloroplasty, pylorectomy, or Loreta's operation in favor of gastro-enterostomy.

The explanation for this choice is not hard to find ; the operation is not a difficult one ; it meets all the indications for operative interference that arise from obstruction of the pylorus, except, perhaps, in those cases of pyloric carcinoma in which pylorectomy is possible ; more than this, it has a salutary effect upon such lesions as are found in the stomach-wall secondary to obstructive disease of the pylorus ; it precludes the possibility of a second operation, which may be necessary after a pyloroplasty or after pyloric dilatation ; the technique has been so perfected that all the unpleasant effects, such as regurgitation of the bile, are now avoidable ; the mortality has been so reduced that it may be regarded a safe procedure as compared with operations upon other portions of the digestive tract.

As to the method of its performance one must choose between a gastro-enterostomy alone or in connection with an entero-anastomosis or a gastrostomy. The added experience of the past year gives further assurance that the posterior operation is the operation of choice in every case. Among those who have contributed to the literature of the subject, practically all are united on this point, and favorable reports of cases operated upon by this method are constantly appearing. As regards the site at which the anastomosis should be established, there have been no new suggestions ; the point selected should be the most dependent part of the stomach in order to insure thorough drainage. As regards the method by which the anastomosis is effected, the choice lies between the use of the Murphy button or some similar contrivance and simple suture.

In this connection we might refer to the discussion which has arisen as to the efficiency of the Podrez method. This method effects an anastomosis by the insertion of two sutures at right angles one to the other, through the entire thickness of both the stomach and intestinal wall ; the necrosis of the constricted areas establishes the necessary communication between the stomach and jejunum. Warneck and Kisselew, in their experiments with this method upon dogs, failed in many instances to get the desired anastomosis. Podrez had already operated upon four cases, and was able in two to verify the efficiency of his method, while Sokaloff had, on the other hand, operated upon four cases, in two of which no anastomosis resulted, although the necessary conditions were observed. These results confirmed those in the experiments of Warneck and Kisselew. Sokaloff stamps the method as unreliable, inasmuch as it is founded upon the supposition that all the layers of the stomach or intestine necrose simultaneously. Reichel proved the fallacy of this theory by showing that the serosa and muscularis resist pressure much longer than the mucosa, the latter undergoing necrosis sooner and thereby so loosening the ligature that it has no constricting effect upon the remaining coats. As pointed out by Sokaloff, this explanation accounts for those cases in which the ligature was found lying loose *in situ* in a cicatrix in the overlying mucosa. The observation of Sokaloff is a reasonable one, and, taken together with the failures attending the experiments upon dogs, furnishes sufficient grounds for a permanent objection to the method as originally described by Podrez. Trezbecky indorsed the Podrez method on account of its simplicity and on account of the time saved thereby in its performance; he advocated the modification of the technique, as recommended by Modlinski, of employing an elastic ligature, which would continue to constrict the layers until the entire thickness of the wall of the stomach or intestine was necrotic. Before adopting this modification he had operated upon a case of carcinoma of the pylorus with pronounced obstructive symptoms; fourteen days after the operation the patient died, and at the autopsy it was found that the ligature had only cut through the mucous membrane, the serosa and muscularis being intact.

While most of the mechanical devices for effecting anastomosis in the gastro-intestinal tract have been of American origin (Senn's plates and Murphy's button), yet these devices are more tenaciously clung to by the surgeons of Europe than by those of the United States. Working along this line, Baracz performed two gastro-enterostomies in which an anastomosis was carried out with aid of plates made of turnips; the plates were seven and a half centimetres long, two and a half broad, and two and a half millimetres thick, with an oval opening in the middle three centimetres long and three-quarters of a centimetre broad. These advantages were claimed by Baracz for his plates: less time is consumed in their introduction, and a broader serous surface is obtained than by other methods, thus insuring against perforative peritonitis. Baracz admits that the employment of these plates is better adapted to an anterior than a posterior gastro-enterostomy; and this of itself is a confession of its imperfection, since posterior gastro-enterostomy is the operation of choice.

Still looking for an improvement on the Senn plate or Murphy button, Martini conducted a series of experiments upon dogs in order to prove the efficiency of a cartilage plate. His operation was conducted in the following way: the plate, constructed of cartilage, was about one or two centimetres long, one-half to one centimetre broad, and three to five millimetres thick. In the posterior wall of the stomach an oval incision two and a half to three centimetres at its widest point was made only through the serosa and muscularis, the mucosa being left intact. The plate was then secured in place by means of a number of sutures, running through the mucosa, the plate being perforated around the periphery for this purpose. After securing one such plate in place in the gastric and intestinal walls, the plates were brought into apposition and secured by silk sutures introduced through the muscularis and serosa. According to the results obtained it was noticed that in from thirty-six to forty-eight hours the mucous membrane was necrotic and the plates were free. On the third day communication between the stomach and intestines was established.

Apart from these suggestions as to the technique of affecting an anastomosis, certain modifications of this procedure have been recommended by various authors during the period under discussion. Ruthowski considers it of especial advantage to be able to resort to forced feeding immediately after the operation, and to this end he adopts the plan of combining gastro-enterostomy with gastrostomy, the tube being passed into the stomach and through the gastro-intestinal fistula into the jejunum. In support of this additional step it is claimed that it prolongs the operation but five minutes, places the stomach at rest, and allows of the immediate administration of food. The tube which prevents kinking of the gut or the formation of the spur is removed on the tenth day. Weitzel indorses this idea, and follows it up with a suggestion that the gastrostomy should precede rather than follow the gastro-enterostomy, on the ground that there is danger in the reverse order of the tube slipping out on reposition of the stomach. This operation Weitzel has called gastro-enterostomosis-externa.

As to the manner of inserting the Murphy button, T. W. Murray does this through a linear incision closed with uninterrupted sutures rather than by the purse-string suture. This prevents puckering of the walls of the stomach, which may interfere with union at some point. Carle and Fantino had already adopted a similar procedure; instead of relying on the purse-string suture a linear incision is made two-thirds as long as the diameter of the button, and through this incision on the stretch the button is introduced. One suture on either side usually suffices to secure the button in place.

Regarding the indications for the performance of gastro-enterostomy, they would seem to include practically all affections of the stomach in which operative intervention is indicated. As one might suppose, malignant pyloric stenosis is the indication in the large majority of cases. Of a series of thirty-eight cases that have been collected from the literature of the year 1899, in twenty-one the cause of the stenosis was carcinoma; in the remaining seventeen the indications for operation included gastric ulcer, benign stenosis, congenital stenosis, gastritis, hour-glass contraction, gastroptosis, and motor insufficiency.

As regards the ultimate effect of gastro-enterostomy upon the stomach, Hartmann and Soupault made some interesting and valuable observations. They found that the stomach often regained its normal dimensions, in some cases quite rapidly, but more often in benign than in malignant cases. The restoration of the organ to its normal capacity seemed to depend upon the condition of the muscularis at the time of operation; thus if there was very pronounced atrophy, or if there was very extensive cancerous infiltration of the muscular layer, either of these conditions would retard or altogether arrest any tendency on the part of the stomach to regain its normal dimensions. Similar results might follow if a suitable coil of intestine had not been chosen, or if the anastomotic opening was not sufficiently large to insure of proper drainage.

It was noticed, too, that the motor disturbances subsided more or less rapidly, according to the duration of the stenosis or to the amount of atrophy, or, again, to the presence or absence of adhesions. The latter, if present, would frustrate any attempt at restoration.

Distinct changes in the character of the gastric secretion were noted. Thus the quantity might be very much diminished, once the obstruction be removed; this phenomenon is explained on the ground that the retention attending obstructive diseases of the pylorus stimulates the secretory function of the mucosa; once the obstruction is relieved the secretory glands of the mucosa become less active and at times undergo atrophy. Not only is the quantity of the gastric juice affected, but its reaction as well; the latter may be changed from a strongly acid to a neutral one, but, as a rule, it remains slightly acid. These changes were by no means constant, and in some cases no change at all was noted.

Not the least interesting were those observations upon the effect of regurgitation of bile. In not a few cases did this occur, and yet without any apparent disturbance of the digestive processes. Attention was called to the experiments of Masse, who established a fistula between the common duct and the stomach in order to determine the effect of bile upon digestion; after a series of observations he was unable to note any ill effects. We call attention to these results, because so much time and thought has been devoted to devising methods by which the regurgitation of bile could be prevented. This has resulted in the elaboration of more than one method that in this respect has given satisfaction. Among the functional results of these operations was noted the return of the urine to normal, both as to quantity and quality, and the subsidence of the persistent constipation.

As a possible complication directly attributable to the operation, Braun's case is alluded to here. Eleven months after a gastro-enterostomy had been performed the patient, aged twenty-five years, was suddenly seized with signs of perforative peritonitis and died. The autopsy revealed a perforative ulcer of the jejunum, and Braun was of the opinion that the ulcer was an ulcus pepticum.

The mortality of this operation is steadily decreasing. Among the larger series from individual clinics which have been published is that of Kappeler, who records his experience with the operation from 1887 to 1898. Of thirty-nine operations, thirty-one of which were for carcinoma and eight for gastric ulcer, the mortality was about 30 per cent.—that is to say, of thirty-nine cases twenty-seven died within the thirty-day limit. These statistics are of little value to-day, because some of these operations were conducted before the technique had been so perfected and at a period when operation was performed only as a last resort.

Hartmann and Sopault have furnished us with the results in a series of twenty cases, including ten operations for carcinoma and five for gastric ulcer. Recovery ensued in every case upon the thirty-day limit.

The average duration of life was seven months. If to this series be added some eighteen isolated cases that have been collected during the past year, the mortality would be about 5.5 per cent.; for the malignant cases, 10.5 per cent., and for the non-malignant, *nil.* A comparison may be made between the mortality of the various procedures that were employed. Thus in malignant cases the simple gastro-enterostomy, anterior or posterior, was followed by a mortality of 12.5 per cent.; in non-malignant cases recovery ensued in every case. The Braun-Jaboulay modification was followed in each case by recovery, while the combination of gastro-enterostomy with a gastrostomy was equally successful. It is questionable whether sufficiently accurate statistics can be obtained from so small a number of cases to be of much value. They do, however, indicate a great decrease in the mortality of the operation, and compare very favorably with those of former years. In the sixty-six cases from Czerny's clinic during a period of thirty months preceding January, 1898, the mortality was 30.8 per cent.; in malignant disease, 38.3 per cent., and in other conditions 11 per cent. Compare these figures with those of a more modern series, such as that given above, and note the marked difference.

One could not review the literature of the past twelve months without being impressed with the abundance of material treating of the advisability of surgical interference in gastric ulcer. The indications for this are not, however, as yet clearly defined; the whole subject is still subjudice, although the rapidly increasing experience of very recent times is bringing order out of chaos.

The situation seems to be this: In cases of acute perforation the necessity for immediate surgical intervention admits of no dispute. Great stress is to be laid upon the importance of an early operation, since the prognosis is good or bad in direct proportion to the time that has elapsed between the perforation and the operation. According to the most recent statistics, as furnished by Lund, the percentage of recoveries during the period 1897 and 1899, in cases operated upon during the first twelve hours, was 86 per cent., and within the first twenty-four hours 73 per cent. Comparing these statistics with those of earlier periods, a very pronounced improvement is noted. Thus, up to 1894 the percentage of recoveries was only 10 per cent., while up to 1897 it was 51 per cent. Richardson believes that the percentage of recoveries, as quoted above, is too high, because of the failure of operators to report their fatal cases.

The operation is not a difficult one in ordinary cases, but there may be occasions in which so many adhesions have formed as to make it difficult to expose or excise the ulcer. The incision should be in the median line in all cases in which there is any doubt as to the location of the ulcer; but where there is a reasonable certainty that it is situated at the cardiac end of the stomach, an incision may be made parallel to the costal cartilages. Once the abdominal cavity is opened, a systematic search should be carried out, according to the order of the frequency with which ulcers occupy one or the other of the regions of the stomach. Thus, 52 per cent. are on the anterior wall; 31 per cent. near the lesser curvature; 27 per cent. near the cardiac end; 13 per cent. near the pyloric end, and only 8 per cent. upon the posterior wall.

When the perforation is found it should be sewed with a single or double row of Lembert sutures, and, as a precaution against subsequent leakage, a small fragment of omentum may be engrafted over this line of sutures. While it is all important that the perforation should be closed, the operation is by no means completed until an attempt has been made in a thorough and systematic way to cleanse the peritoneum, which, in the majority of cases, will at the time of operation have been already infected. Fortunately, the presence of the adhesions will confine the area to a more or less limited space. Upon the extent of the area involved, and upon the virulence of the organism, will be based the prognosis.

The method of cleansing the peritoneal cavity here differs in no way from that employed in the presence of peritonitis of other origin, excepting, perhaps, in those cases in which the ulcer is situated upon the posterior wall of the stomach. Then it is necessary to open, drain thoroughly, and irrigate the lesser peritoneal cavity, paying especial attention to the region between the diaphragm and the liver—a region which is difficult of access, and yet one which is most apt to be contaminated, and, if neglected, to give rise to subphrenic abscess. In order to prevent such a complication, it has been suggested that the lesser peritoneal cavity be opened and inspected on all occasions.

Hemorrhage furnishes another indication for operation, not only repeated copious hemorrhages, but the frequent small hemorrhages associated with marked anæmia and dilatation of the stomach. The percentage of recoveries after operation in this class of cases is anything but satisfactory, more especially after copious hemorrhages. The mortality, according to different observers, varies from 60 to 70 per cent. As regards the propriety of operating to control hemorrhage, Mayo Robson, in his Hunterian Lectures, says: "I cannot help feeling that operative treatment in acute hemorrhage gives such a high rate of mortality (64.2 per cent. as compared with but 5 to 10 per cent. treated medically) that it is better in such cases to rely solely upon medical means. But in the repeated chronic hemorrhages that are responsible for quite half the total deaths from hæmatemesis, the operation of gastro-enterostomy affords a reliable method of treatment, since it at the same time gives rest to the stomach and removes the hyperacidity of the gastric juice, by an operation that can be done with rapidity and comparative safety. Moreover, when the ulceration is at the pylorus, where it so frequently leads to hypertrophy and stenosis, the operation not only relieves the symptoms for which it is undertaken, but proves curative to the disease." With these conclusions most surgeons will agree, while, at the same time, they recognize certain exceptions. Thus, in those cases where the hemorrhages are copious, frequent, and uncontrollable by medical means, the question of operative interference may be raised with perfect propriety. Once operation has been decided upon, the mode of procedure must be chosen from these methods: excision, ligation *en masse*, cauterization, ligation of the bleeding vessels, and, should the ulcer involve the pylorus, perhaps a pylorectomy. In the majority of cases excision of the ulcer or ligation will meet all the requirements; pylorectomy may be reserved for those cases in which the ulcer is situated on the pylorus; cauterization or ligation of the bleeding vessels is not radical enough to deserve consideration.

In cases of a more chronic type, where there is a history of small and repeated hemorrhages, inducing a grave anæmia, operative interference gives very great satisfaction; and the operation of choice is, for reasons already mentioned, gastro-enterostomy.

There remains to be considered those cases of gastric ulcer in which pain and vomiting persist in spite of medical treatment. Here operation is rather one of choice than of necessity, and it must be left to the judgment of the attending surgeon whether the symptoms are severe enough to demand the use of the knife. In this connection the surgeon may be guided by the results of Greenough and Joslyn's investigation as to the condition of a series of cases five years after their discharge from the hospital. Of one hundred and fourteen cases treated at the Massachusetts General Hospital, but 40 per cent. had remained well at the end of five years, whereas 80 per cent. had been previously discharged as cured or relieved. Thus the failure to effect a permanent cure was 60 per cent., while the mortality was 20 per cent. Comparing this with the low mortality of gastro-enterostomy carried out in the absence of peritonitis, one sees at once the propriety at least of giving very serious consideration to operative interference.

Little if anything has been accomplished during the past year toward the perfection of the technique of gastrostomy. The operations which command the greatest confidence are those of Kader and Marwedel, both of which were described in 1896. The most recent work upon this subject is a monograph by J. Braquehaye. It treats, first, of the indications for this operation, which are divided into three classes: those in which the obstruction is non-malignant; those in which it is malignant, and those in which neither of these factors play a part, the latter class including partial absence of the œsophagus, or congenital malformation, tracheo-œsophageal fistula, diverticula, and pressure of a tumor. As to the variety of operations they may be subdivided into four classes: 1. Those in which the operation is performed at two sittings. 2. Those in which the closure of the stomach is maintained by a sphincter-like action. 3. Those in which closure is maintained by a valvular action. 4. Those in which a combination of the valvular and sphincter-like action is employed.

Surgeons at large give the preference to those procedures which depend for their efficiency upon a valvular action, and of these the best are those of Marwedel and Kader. These operations are the ones which can be carried out the most rapidly—and time is always an important consideration in these cases, since the patients are at the time of operation more or less cachectic. Marwedel's operation differs from Kader's in that in the former the tube is passed through an oblique track into the stomach-wall, while in the latter it passes directly into the stomach through a funnel-like process. In its present stage of perfection there is practically no danger of leakage into the peritoneal cavity after gastrostomy. There is scarcely any chance of the stomach contents escaping through the external wound, and but little likelihood of subsequent contraction of the newly-formed fistula. Keen says that the mortality of this operation in the most difficult cases would not be higher than 10 per cent., and, to quote Mayo Robson, "It would not be an exaggeration to say that if cases of incurable stricture of the œsophagus or of obstructive cancer of the cardiac end of the stomach were handed over to the surgeon at a sufficiently early stage the mortality would not exceed from 5 to 10 per cent."

As regards the time at which operation should be performed in malignant stenosis of the cardiac end of the stomach, it is all important that this should be done once the diagnosis is made—that is, without regard to the degree of dysphagia. The advantages of an early operation are these: it allows of the patient receiving sufficient nourishment, and by putting the œsophagus at rest it does away with the mechanical irritation, retards the progress of the growth, and thereby prolongs life. As to the duration of life after this operation, one case has been reported in which the patient survived for a period of four hundred and two days. In non-malignant cases the longest period for which the patient has survived the operation is sixteen years.

To sum the matter up it might be said that the operation of gastrostomy, as performed to-day, is almost ideal. In none but the more difficult cases—those in which carcinoma is of long standing and the cachexia profound—should there be any appreciable mortality. The immediate benefits derived from placing the patient upon a sufficient diet, and thereby improving the general nutrition, are most pronounced. The subjective annoyance to the patient of the presence of a gastric fistula is practically *nil.* From the stand-point of the surgeon the operation is equally satisfactory, not only on account of its safety, but also on account of its simplicity and ease of execution.

Three years ago Schlatter, of Zurich, startled the medical world with an announcement of his sensational operation. Connor, of Cincinnati, had already made an attempt to remove the entire stomach, but his patient died upon the table. From the time of Schlatter's operation up to the present but eight additional cases have been reported with such results as will be seen presently. The history of the entire series may be told in a few words. Schlatter's case was operated upon September 6, 1897, and died October 29, 1898, about fourteen months later. At the autopsy evidences of metastasis were found in the mesenteric, retroperitoneal, bronchial, and supraclavicular lymph-glands, and in the pleura. That the death of the patient was not due to impoverished nutrition but to carcinomatosis seemed to be borne out by the records of the case from the time of the operation until death. This would seem to teach the physiologist that human life cannot only be sustained but that the individual can gain in weight from the assimilation of food solely by the intestinal tract.

On February 24, 1898, Charles B. Brigham, of San Francisco, operated upon a patient sixty-six years of age, uniting the œsophagus to the duodenum by the Murphy button. The latest report of his patient's condition was published early in February of this year, practically two years since the operation was performed. She is able to do general housework, her diet requires no particular restriction, and she eats three hearty meals a day. Since the spring of 1899 she has gained in weight. The Murphy button has never been passed; and a skiagraph taken on January 12, 1900, demonstrated it lying a little to the left of the spine, at the level of the eleventh dorsal vertebra. At present there is no evidence of metastasis; the blood count shows no leucocytosis.

Delatour (May 2, 1898) removed the entire stomach from a woman, aged twenty-six years, the growth being adenocarcinoma. She reacted well, had gained thirty pounds at the end of six months, and seventeen months after the operation her condition was reported as being excellent.

On May 31, 1898, M. H. Richardson, of Boston, performed the fifth total gastrectomy. In November the wound reopened and began to discharge, and in February, 1899, the patient died of intestinal obstruction, due to extensive dissemination of carcinoma. The autopsy revealed most extensive cancerous infiltration, involving the abdominal wall and intestines alike, with evidence of general carcinomatosis. Richardson draws the following conclusions from this case: The patient's health would have been fully re-established had there been no recurrence; the subsequent sufferings of the patient were due rather to the mechanical effects than to the cancer itself; œsophago-duodenotomy is technically possible in a certain number of cases; the experience gained in this case encourages rather than forbids further attempts in the surgical treatment of gastric cancer. Comparing the history of other cases that have not been subjected to operation with those that did undergo that procedure, Richardson believes the suffering of the former class to be much more intense, while those patients have not had the satisfaction of knowing that they had accepted the one chance for recovery.

Four months later (September, 1898) G. C. MacDonald, of San Francisco, operated upon a male patient, and met with the same success as his fellow-townsman. At the last report, some eighteen months later, his patient was in excellent condition, was doing the work of a farm laborer, eating all kinds of meats and vegetables, and suffering no inconvenience therefrom. MacDonald lays stress upon the importance of the proper selection of cases and upon the necessity of securing perfect coaptation at the point of anastomosis.

T. F. Chavasse reported, in the *Transactions of the Pathological Society of London*, vol. l., the sixth case. This case and those of W. H. Kobb (death on the table) and A. C. Bernays (death in thirty-six hours) comprise the three fatal cases in this series of eight.

John B. Harris, of Troy, reports the fourth successful case. In May, 1899, the operation was performed. The patient, a woman, aged forty-six years, was discharged from the hospital June 15, 1899, after a meal of roast beef and mashed potatoes, having in that short time gained about twenty pounds. The anastomosis was effected without difficulty by a double row of sutures.

Excluding the operation of Connor, which was carried out before the technique of abdominal surgery had begun to attain its present state of perfection, there have been reported nine cases of total or complete gastrectomy. Of these, four are still living; two died, fourteen and seven months after the operation, respectively, and the remaining three died upon the table or within thirty-six hours. The mortality of this series is 33 per cent. Certainly, it must be admitted that the operation has a field—to be sure, a limited one—in the surgery of the stomach. Face to face with these results, the operation cannot be branded as impracticable or as unjustifiable. The lesson to be learned from the experience which these few surgeons have had seems to be this: that, given a patient in fairly good health, with a carcinoma which has not grown beyond the confines of the stomach, it is perfectly feasible and practicable to extirpate this organ completely and to effect a perfect anastomosis between the œsophagus and the duodenum, with or without the aid of the Murphy button; that, providing metastasis has not already occurred, the patient may entirely regain his or her health, and will then be able to ingest and assimilate food of the same quality and almost in the same quantity as before the operation; that the process of metabolism seems in no way disturbed so far as the patient's health is concerned. In both the patients that survived the shock of the operation, but died some months later, the records would seem to prove that death was not due to impoverished nutrition but to the results of metastasis. Indirectly, the lesson to be learned is the importance of an early diagnosis—one established, if necessary, by the aid of an exploratory operation—not delaying for its confirmation until the tumor can be felt through the abdominal wall, for the time for operation will then often have passed. Richardson says: "Cancer of the stomach, if extirpated in its earliest stages, offers as good a chance of recovery as cancer of the uterus."

It would not be amiss to refer at this juncture to a partial gastrectomy carried out by F. V. Cantwell upon a woman, aged fifty-two years. A sarcoma, arising from the posterior wall of the stomach, and weighing twelve pounds, was removed. The patient recovered from the operation, but there was evidence of very rapid recurrence within six months. As to the technique, the divided portions of the stomach were united with two layers of sutures, one a continuous, the other a mattress suture, and these together rendered the wound absolutely water-tight. Mayo Robson has collected fourteen cases of partial gastrectomy in which at least three-fourths of the stomach had been removed for cancer. Of this series the mortality was 28.5 per cent.

When we have reviewed the literature pertaining to gastro-enterostomy, gastrostomy, gastrectomy, and the operative treatment of gastric ulcer we have covered the greater part of the field in which there has been any activity during the past year. As gastro-enterostomy is growing more and more in favor, so pyloroplasty and Loreta's operation seem to be sinking into disfavor. As has been pointed out, the results following gastro-enterostomy are so much more apt to be permanent than are the results of pyloroplasty or Loreta's operation, and the beneficial effects upon the pathological conditions existing in the stomach at the time of operation are so much more pronounced, we can readily understand why so little attention is paid to those operations which deal directly with the pylorus.

The method of treating dilatation of the stomach by gastroplication has received some attention during the past year. The operation consists in raising the lowered greater curvature of the anterior wall of the stomach, folding it upon itself, and fixing it in position by two rows of sutures.

In glancing over the various methods that have been adopted in the treatment of carcinoma of the pylorus, one is at once struck with the small number of pylorectomies that have been recorded of late. Not only have few such operations been performed, but also very little attention seems to have been paid to this subject in recent treatises upon the surgery of the stomach. This may be due to the fact that patients do not submit to operative interference until such adhesions have formed around the pyloric growth as to make its complete removal impossible.

A review of the literature of the surgery of the stomach would not be complete without referring to a work published in 1899 by Terrier and Hartmann (*Chirurgie de l'Estomac*). There is no other book that treats of this subject in such a comprehensive and modern way. The individual operations are well described and splendidly illustrated, so that as a work of reference, especially in regard to operative technique, it is invaluable. As an indication of the relative importance of the various operative procedures described, we find about three hundred pages devoted to gastrostomy, gastrectomy, and gastro-enterostomy, while the balance of the book, including some fifty pages, embraces all that has to be said of excision and dilatation of the pylorus, pyloroplasty, gastrorrhaphy, and gastropexy.

REVIEWS.

I. THE GROSS AND MINUTE ANATOMY OF THE CENTRAL NERVOUS SYSTEM. By H. C. GORDINIER, A.M., M.D., Professor of Physiology and of the Anatomy of the Nervous System in the Albany Medical College; Member of the American Neurological Association. With 48 full-page plates and 213 other illustrations, many of which are printed in colors, a large number being from original sources. 8vo. Philadelphia: P. Blakiston's Son & Co., 1899.

II. THE NERVOUS SYSTEM AND ITS CONSTITUENT NEURONS. Designed for the Use of Practitioners of Medicine and of Students of Medicine and Psychology. By LEWELLYS F. BARKER, M.B., Tor., Associate Professor of Anatomy in the Johns Hopkins University and Assistant Resident Pathologist to the Johns Hopkins Hospital. With two colored plates and 676 illustrations. New York: D. Appleton & Co., 1899.

III. THE ANATOMY OF THE CENTRAL NERVOUS SYSTEM OF MAN AND OF VERTEBRATES IN GENERAL. By LUDWIG EDINGER, M.D. Translated from the fifth German edition by WINFIELD S. HALL, Ph.D., M.D., assisted by PHILO LEON HOLLAND, M.D., and EDWARD P. CARLTON, B.S. Illustrated with 258 engravings. Philadelphia: The F. A. Davis Company, 1899.

IN spite of the enormous amount of work that has been devoted to the central nervous system in man, we are still far from any adequate knowledge of its structure and functions. This is the result of the extreme complexity of the structure and the impossibility of devising any adequate experiments which will enable us to study the functions of the sensory neurons or the way in which certain portions of the brain act upon other portions—that is to say, the functions of the endogenic neurons. Various methods of arriving at a clear understanding of the central nervous system have been devised, each of which is vaunted by its particular school, although, of course, no leader in this branch has ever been satisfied to pursue one method to the exclusion of all the others. The most obvious method is direct observation, and it was practically the only method pursued by the older anatomists, and was, moreover, the method that produced such magnificent results in the hands of Stilling. Next in course of time was the study of the effects of pathological lesions, and from this naturally arose the experimental work upon the lower animals in the attempt to elucidate some of the problems of human cerebral anatomy. At the same time it occurred to another class of students that comparison of the human brain with the brains of the lower animals, particularly if the latter were studied in the order of their development from the lowest to the almost human type of the anthropoid apes, would yield valuable information, and finally Flechsig has added greatly to our knowledge by his method of studying the periods at which the different groups of fibres in the central nervous system assume their myelin sheaths; but all these methods give us merely an idea of the grosser features. Microscopical technique, however, has advanced so greatly with the discovery of various methods of staining that we are able nowadays to study very minutely the anatomy of the individual nerve-cells. How much has been added to the knowledge that was gained, or that could have been gained, by the old carmine stain it is useless to discuss. Even the Golgi method of impregnation, beautiful as it is and wonderful as its results have been in the hands of such masters as Golgi himself, Cajal, Kölliker, and Lenhossek, has added only a few really new things to our knowledge. That these things are of paramount importance must be admitted. The method of Nissl, in spite of the elaborate terminology that its inventor has devised, has added but little to our knowledge of the normal anatomy of the cells, for the tigroid bodies can be seen with hæmatoxylin, and the outlines of the cell are shown no more clearly than with carmine. The revelation of more minute features is claimed for the complicated methods of Apathy and for the as yet unpublished method of Bethe. To these methods we owe our modern conception of the neuron theory, especially to that of Golgi. According to this theory, the nervous system is composed of a series of units, each of which consists of a nerve-cell, its dendritic or branching processes, and its axis-cylinder—also a branching process, but somewhat different in character. The cell is usually an irregular or round body containing a nucleus, a nucleolus, and in the protoplasm of some of these cells there are small masses of granules that take the basic aniline stains. The dendritic processes usually branch freely, becoming smaller and terminating in a fine network of fibres provided with little lateral buds or gemmules, which do not, however, as far as we have been able to determine, come in contact with any part of any other neuron. The axis-cylinder is a long, slender process of equal calibre throughout that gives off from time to time yet more slender lateral processes—the collaterals—and that terminates in various ways, either in a fine tuft of fibres that are placed in close relation to the protoplasmic processes of another cell, or in some special peripheral sensory area, or in a muscle plate. We know something of the apparent function of these three elements. The axis-cylinder is certainly a path for the conduction of nervous impulses from the ganglion cell to its termination; the cell body probably generates these impulses or modifies others that it receives, maintaining at the same time a trophic influence over the whole neuron, so that when it is destroyed its processes degenerate. In some of the lower animals it is possible that the neurofil, or network of dendrites and collaterals, is capable of an existence independent of the presence of the ganglion cell. Regarding the functions of the dendritic processes, we are at present in doubt. According to some authors, particularly Lenhossek, they are cellulipetal organs conveying impulses from their peripheral terminations to the cell—a theory that is favored by the presence near their terminations of the terminal fibrilla of the axis-cylinder that forms part of their chain. Lenhossek even believes that certain nerve fibres conveying impulses to the ganglion cells of the spinal cord are nothing but modified dendritic processes. Other writers, however, chiefly because of their resemblance in form to the branches or roots of a tree, have supposed that they have a nutritive function and represent merely a mechanical extension of the protoplasm of the cell, so that it becomes capable of presenting a greater surface to the nutritive fluids that surround it. In favor of this view is the fact that the substance of the dendritic processes, at least of the main trunks, is very similar in structure and staining reactions to the substance of the protoplasm of the cell itself, and, further, that frequently a particularly stout protoplasmic process can be seen extending from the cell to some adjacent blood-vessel. Now, the central nervous system is, as a matter of fact, composed practically of nothing but these neurons embedded in a mass of fibrous connective tissue that is derived from the epithelial layers of the embryo, and is called neuroglia. It has been found that, in general, neurons having the same functions or influences over certain local areas in the body are placed close together—that is, in groups or bundles. It has been customary, therefore, in studying the anatomy of the nervous system, to regard it as made up of groups of ganglion cells, or, as they are commonly and confusingly termed, nuclei, which are composed of the cellular elements of neurons with similar functions, and of bundles of nerve fibres or tracts which are composed of the axis-cylinders that proceed from these nuclei to the point where the impulses that they generate are supposed to act. The nuclei are aggregations of cells and can usually be studied directly—that is, they occur in groups, and all the cells in these groups can readily be stained. The presence, however, of numerous nuclei close together, or their overlapping, often renders it difficult to determine the limits of each one. The course of the fibres is traced with more difficulty, and various methods have been resorted to for the detection of the situations of these tracts and their termination. Of these, three methods are most important: First, direct observation, certain bands of fibres being separated from their surroundings and recognized as such without, or sometimes with, preparation; second, the study of degenerated fibres, staining recent degenerations by the Marchi method, those of older date by the Weigert method; and third, the method of Flechsig, or the study of the embryonal development of the fibres. We have at least learned from these that the neurons are arranged in chains, thus, in the motor tract one neuron passes from the cortex to the spinal cord, and where it terminates another passes out along the peripheral nerves to a muscle in the sensory chain. The sensory fibre passes from the periphery to the ganglion cell, which also sends out a fibre that enters the spinal cord, and comes into relation either there or in the medulla with the secondary neurons, which also terminate in all likelihood in the basal ganglia, where the third neuron conveys the impulse to the cortex. As direct contact has not certainly been observed, various theories have been suggested to explain how the nervous impulse passes from the termination of the axis-cylinder of one neuron to the ganglion cell of the next in the chain. It has been supposed that the dendritic processes are capable of movement, and that they form actual contact with the fibres from the axis-cylinder, or that without direct contact an impulse may be set up in one cell by the activity of the nervous impulse in another by a sort of induction. A difficulty of this theory, which does not seem to have occurred to most of its advocates, is that supposing we admit the neuron to be an independent unit, there is no route provided for the return of the nervous impulse to the cell that generated it, unless we can imagine it passing back up the axis-cylinder—a movement that there is no reason to believe occurs. Apathy, whose results have been more or less accepted by Bethe and Nissl, has found by special methods of staining, minute fibrils in the nerve cell, that pass out by the protoplasmic processes and into other nerve cells, thus forming contact throughout the entire nervous system. His work, however, on account of the extreme complexity of the methods employed, has not as yet been sufficiently confirmed. At any rate, the transmission of impulses from one neuron to another certainly does occur, and it makes little difference, as far as the functional result is concerned, just how it is brought about.

Until very recently the anatomy of the central nervous system was neglected by systematic general writers, and the English reader was driven to translations from the German or to text-books of anatomy. It is true that in one of these text-books (Quain's) the article written by Schaeffer is quite equal in excellence to anything that has been done in any other language, but no separate book existed. This deficiency has been overcome recently.

Gordinier has provided a most excellent practical work, profusely illustrated with plates and inserted figures. The book professes to be merely a text-book of the subject, written primarily for the student and adapted to his needs. It commences, therefore, as is customary in such books, with a description of the histology of the nervous system, then takes up the spinal cord, the cerebellum, and the various regions of the brain. The work concludes with a description of the histology of the cortex, the course as far as known of the fibres in the centrum ovale, and has chapters on the bloodvessels, on cerebral localization, on the embryology of the brain, and on the macroscopical and microscopical technique. The book does not pretend to contain any strikingly original matter, but does aim to present what is known on the subject clearly and logically. In this we believe the author has fairly succeeded; the style is lucid, the illustrations are well chosen, and in general well printed. There are certain features of the book that we perhaps are not altogether unjustified in pointing out. We think the book is larger than is necessary, and this excessive size is due to the large type, generously leaded, that is employed for the text. It is not really easier to read large type than reasonably small type that is clear, and this makes the book heavier and more clumsy. Many parts could have been printed in small type without any impairment to the value of the book, and this would also have served to reduce the size, particularly those parts relating to microscopical and post-mortem technique. Another factor that is not altogether praiseworthy is the repetition of plates with separate numbers. Of course, as a matter of fact, there are forty-eight plates in the book, but they are by no means all different. These, after all, are all very minor matters. A more serious fault is the almost total neglect of the literature of the subject, references being introduced in the rarest instances, although the author must have known that his excellent book would find a much wider circle of readers than that bounded by the walls of the class-room.

Barker's book is an ambitious effort to present the material now accumulated concerning the anatomy of the brain and cord within the limits of a single book, and always with strict reference to the neuron theory. The book consists of over 1100 pages, to which some plates with letter-press are appended. It is divided into various sections, profusely and excellently illustrated, and the arrangement is logical. Abundant use has been made of the literature of the subject, which has been read thoroughly and intelligently and abstracted with careful fairness. If we may be permitted to point out certain features that to us appear to be defects, possibly merely those incident to a first edition, we would like to speak first of the length of the book. It is at least twice as long as seems necessary, the style is diffuse, and some material has been introduced that is not altogether relevant to the subject, although in some instances it is quite interesting. Thus, on page 31, there is a panegyric upon Ehrlich's work, that, brief though it is, might have been omitted without injury. There are also numerous repetitions, and some things are stated as certain concerning which a few of us entertain what we believe to be as yet a not altogether unreasonable skepticism, particularly, for instance, in regard to the direct dendritic processes of the cells. Neither do we agree with Barker's conclusion that if certain anastomosis between the terminations of the axis-cylinders and the dendrites, for which no anatomical relations indicating conduction can be discovered, are assumed to have no nervous functions, then we are obliged to admit that the transferrence of impulses from one neuron to another may be the sum total of the nervous functions. After criticising the length it will appear ungracious, perhaps, to suggest that anything might have been added, but it would have been delightful to have had Barker describe for us in his clear manner the marginal veil theory of His, which is barely mentioned. There are two or three little defects of arrangement that we may also notice. In a few of the illustrations the letters appended to the figures are explained only in the text and not in the legend. It is our belief that this should never be the case. The table of contents, for some inexplicable reason, is divided into two parts, the second part being placed in the body of the book. There is not really sufficient distinction between the two parts to justify this, and it is more than inconvenient. The excellences of Barker's work are numerous. A more thorough review of the literature of the subject has probably never been made, and perhaps could not have been made by a man who had devoted his life to this branch or who had a theory to defend, for then his opinions could not have escaped the influence of the personal equation. Not that we mean that Barker has made no investigations of his own, for it is very evident that he has made many; but we think it just to say that the new knowledge concerning the anatomy of the central nervous system that appears in this work is practically negligible. The illustrations are often really luminous; many of them are original, and some of these are of extraordinary value, particularly the horizontal sections through the pons and medulla of a new-born babe, prepared by Dr. Hewetson. The diagrams of the relations of the nuclei in the brain, as projected upon a plane surface by Miss Sabin, are also valuable, but, of course, only to one who has worked with the actual specimens. Many of the subjects are discussed in a masterly manner. We think perhaps that the description of the structure of the posterior columns of the cord and of the course of the fibres entering by the posterior roots is one of the best features of the book, but among so many excellent features it is difficult to choose. Popular subjects, such as cerebral localization, or the discussion of the relations of morphology to psychology, are only incidentally mentioned. The neurologist will, of course, find in it much that is of value to him, but he will be obliged to search for it carefully. On the whole, America is to be congratulated for having produced what is probably the most complete work in the English language upon the anatomy of the brain.

Edinger's book is practically a new work, although it is called a fifth edition. The industrious author has introduced a second part, in which he reviews the embryology and the comparative anatomy of the vertebrate brain, studying each portion of the brain through the whole vertebrate kingdom up to man. This is the most complete and masterly treatise upon this important subject that has hitherto appeared, although, if we are to believe rumor, a more thorough work is now in course of preparation. It is hardly necessary to make any criticism of Edinger's book. It is a book not for the beginner, but for the specialist. The treatment of the subject is all technical, and the mass of information at Edinger's disposal is too vast to allow him to present a text-book for beginners. In order to keep his work within the bounds of a series of lectures he is obliged to hint at many subjects which to him are clear, but to the rest of us, unfortunately, are not so comprehensible. The book is of considerable value to the general reader, for in it are introduced discussions of various popular subjects, particularly the relation of the brain to the mind. Edinger has little hesitation in locating the highest psychic functions in the cortex of the brain. He gives a very interesting and valuable *résumé* of our knowledge of the relation of the enlargement of certain parts of the brain to certain varieties of intelligence, but reaches the lame and impotent conclusion that in regard to this subject we are still obliged to devote ourselves to the collection of data and not to the discussion of it. The translation in general is excellent. There is a slight flavor of the original German that is not altogether distasteful to those already acquainted with the language, such as the phrase " by the numerous already decussated." Occasionally a word is misused or not used according to the English idiom; thus, the spinal cord is sometimes spoken of as the " spinal marrow, now nearly obsolete." On page 127 the epiphysis is called an " impaired " organ, and although this is literally correct, we suspect that " unpaired " would have been nearer the meaning Edinger intended to convey. The book is carefully printed; the illustrations are almost equal to those in the German edition, having suffered but little in the transferrence. It is the smallest of these three books, and yet we cannot help feeling after perusal that it contains the greatest amount of important material. The third part shows no essential change from that of the preceding edition.

J. S.

CHIRURGIE DU RECTUM. Par E. QUÉNU et H. HARTMANN. Tome II. Tumeurs du Rectum. 8vo., pp. 384, avec 74 figures et 28 planches hors texte. Paris: G. Steinheil, 1899.

THIS handsome work is a second volume of the elaborate treatise on rectal surgery being written by the authors. The previous volume, published about five years ago, took up the consideration of the anatomy and other preliminary matters, as well as inflammations of the rectum. This volume discusses rectal tumors, and does so in an exceedingly satisfactory manner. As would be expected, a great deal of attention is given to the histology of these morbid growths.

The microscopical illustrations, many of which are colored, are very beautiful. There are also a great many plates showing the macroscopical appearance of the varieties of rectal disease; a considerable number also of these plates are colored. More than half of the book is occupied with a consideration of rectal cancer. The various methods of removing the diseased portion of the bowel are described. The authors advocate a combined abdominal and perineal operation, by which a thorough eradication of the diseased organ is made possible.

The authors divide rectal tumors into those of epithelial type, those of connective tissue type, and those of the muscular type. They then devote a short chapter to certain growths observed in the rectum, but which they think are scarcely properly included in the category of true tumors. These are angiomas, dermoid cysts, and some teratomas. They do not consider hemorrhoidal disease as properly belonging to the group called angiomas, hence hemorrhoids are not discussed in this volume. A limited number of cases are quoted in order to illustrate the statements of the writers, but the book is not overloaded with clinical histories.

The fine paper and the excellent manner in which the printer's work has been done make the book very agreeable to the eye. The scientific value of its chapters and the bibliographical references contained in the foot-notes will give it a permanent place in surgical literature. It is destined to be frequently referred to by those interested in the surgery of the lower bowel. J. B. R.

TRAITÉ DE CHIRURGIE CLINIQUE ET OPÉRATOIRE, publié sous la direction de MM. A. LE DENTU et PIERRE DELBET. Tome huitième. Mésentère, Pancréas, Rate, Foie et Voies Biliaires, Anus et Rectum, Rein, et Uretère, avec 123 figures. 8vo., pp. 972. Paris: J. B. Bailière et fils, 1899.

THE eighth volume of this comprehensive treatise, which will consist of ten volumes, discusses the surgical affections of the mesentery, pancreas, spleen, liver, anus, rectum, kidney, and ureter. The articles are written by Villar, Faure, Delbet, Guinard, and Albarran, and seem to be prepared with care and thoroughness. The illustrations are not very numerous for a volume of such size, and, though sufficiently demonstrative, are scarcely good enough, in an artistic sense, to be used in a work of reference of such pretensions as *Traité de Chirurgie.* Most of them are too sketchy to be considered satisfactory. They, however, show the points to which the authors desire to call attention, and perhaps that is all that is really essential in illustrations.

Due consideration seems to have been given to American operators and writers on abdominal surgery, but the spelling of their names will sometimes be found a little unfamiliar to their American colleagues.

J. B. R.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,

PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,

PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

Cancer of the Stomach.—H. STRAUSS (*Berliner klinische Wochenschrift*, 1899, No. 40) reports the case of a patient with carcinoma of the fundus and lesser curvature of the stomach, combined with subphrenic abscess between the anterior abdominal wall and the stomach. Strauss speaks briefly of the rarity of this complication, and goes on to speak in detail of the significance of pus in the stomach contents. In his own case, though the motor-power of the stomach remained good to the end, as much as a quarter of a litre of pus could sometimes be removed from the fasting stomach. In the washings of every fasting stomach leucocytes singly and in groups can be recognized. This, however, is not pus which, macroscopically recognized, is found in measurable quantities only under certain conditions. Aside from phlegmonous gastritis, abscess of the stomach, suppuration of the digestive tract above the stomach, and perforation or abscesses into the stomach, the author has found pus only in cases of cancer and in the present case of subphrenic abscess. In cases of cancer the pus was found especially in those affecting the lesser curvature or the fundus in which there was no motor disturbance. That it occurred in such cases is especially important because they are obviously difficult to recognize by the usual signs. The fact, however, is easily explained because in cases with stagnation the pus would become mixed with the food. Nevertheless, cases with stagnation reveal pus on microscopical examination, but in this a certain amount of experience in the microscopy of the stomach contents is necessary in order to exclude admixtures from outside of the stomach. The author, therefore, lays down a rule that in all cases of carcinoma of the stomach, especially when there is no disturbance of motility, the fasting stomach should be examined for pus.

The presence of blood has the same value as that of pus when pure or mixed with mucus or pus in the fasting stomach. The differential diagnosis from achylia gastrica is especially difficult in such cases, and, according to the author's experience, by no means easy to make from the chemical examination alone. Thus, out of thirty-two cases of cancer of the stomach, of which four showed free hydrochloric acid, only fourteen gave an unequivocal lactic acid test. In three cases scraping with the soft tube revealed carcinoma particles. The author thinks that the positive result of scraping speaks rather for cancer than for achylia, and has seen no dangerous results from the operation. As with other signs, however, a single negative result is of no value. Strauss also calls attention to the value of certain metastases in the diagnosis of cancer of the stomach and in addition to the presence of these in Douglas' cul de-sac, mentions some in the mediastinal lymphatic glands, as shown by the Röntgen rays.

The Secretion of Pepsin in Gastric Diseases.—ROTH (*Zeitschrift für klinische Medicin*, Bd. xxxix. p. 1) has made some experiments in Ewald's laboratory, using the method of Mett, and finds that, while easily carried out, it gives results sufficiently accurate for clinical purposes. According to this method egg albumen is coagulated in glass tubes from one to two mm. in diameter. The coagulation must be uniform. In order to get good results in different cases, Roth usually heated the tubes for fifteen minutes at 95° to 98° C. In the experiments all the tubes were cut in lengths of two to three cm. Roth used the filtrates after the Ewald breakfast, though bearing in mind the fact that filtrates do not digest as rapidly as unfiltered stomach contents. In addition to tubes placed in the native gastric juice, others were tried in gastric juice in which the free HCl had been brought up to thirty. Working in this way he found that the variations in the secretion of pepsin are normally just as great as those of hydrochloric acid. Cases of hyperpepsia were found, and the highest degrees of these were found in cases of irritation, such as ulcer or nervous anomalies of secretion. Low proportions of pepsin were found in atrophy following chronic gastritis, in carcinoma when associated with chronic gastritis, and in nervous disturbances. Pepsin determinations have less importance in diagnosis than in treatment. They are likely to be especially useful in cases where histological observations of the mucous membranes can be made by operations during life or post-mortem.

Dilatation of the Stomach after Traumatism.—COHNHEIM (*Archiv für Verdauungs-krankheiten*, Bd. v. p. 405) saw a patient who, after a fall, had symptoms of gastric ulcer. A few months later he had marked symptoms of motor insufficiency and dilatation. On examination the stomach was found to contain large quantities of undigested food, yeast, sarcinæ, and free hydrochloric acid. An interesting point in the history was that the patient, on the advice of friends, took to drinking linseed oil, taking a small quantity every morning and night, and after five weeks of this treatment recovered entirely, as shown by an examination of the stomach contents. According to him, the linseed-oil treatment is well known in some parts of the world, and Cohnheim attributes to its use a soothing influence on the pylorus similar to that shown in cases of stricture of the œsophagus from new growth. Cohnheim has made a study of the cases of traumatic dilatation of the stomach in the literature and from the records of Boas' polyclinic, basing the diagnosis of the dilatation always on the presence of decomposing food remains in the fasting stomach. The cases are cited in abstract, but sufficiently in detail to add much to the value of the article. It will suffice to give the author's conclusions from the examination of these cases:

1. Trauma in the stomach region can lead to chronic dilatation of the stomach by producing a perigastritis or ulcer. The acute dilatations observed after trauma are all due to obstruction of the duodenum from ileus.

2. Chronic traumatism such as pressure frequently leads, especially in men, to ulcer, and later to dilatation of the stomach.

3. Genuine gastrosucorrhœa is the consequence of relative stenosis of the pylorus or duodenum; it is not the cause of the gastric dilatation.

4. A large proportion of cases of dilatation result from frequently repeated pyloric spasm following ulcer with hyperchlorhydria, and can recover completely; a large proportion are the result of an organic obstruction, and can recover partially; only in a small proportion is the stenosis so severe that indications for operation are present.

5. A chronic dilatation in consequence of primary muscular weakness is highly improbable, and hitherto not demonstrated by unimpeachable observations.

6. Atony can only go on to dilatation when a complication involving an obstruction is added.

7. Dilatation is the result of a local process at the pyloric outlet; atony part of a general disease; between the two there is a difference of kind, not of degree.

Color Strength and Iron of Human Blood.—Rosin and Jellinek (*Zeitschrift für klinische Medicin,* Bd. xxxix. p. 109) have a valuable paper on this subject, concerning which so much has been published in the last few years. A useful bibliography adds to the value of the article. The authors made comparative examinations by counting the blood-corpuscles, estimating the color-strength by Miescher's modification of Fleischl's apparatus, and the iron by Jolles' ferrometer. The details should be read in the original; we have room here only for some of the conclusions. In general the authors confirmed the statements of all previous writers that there is no fixed relation between the color and the iron, nor between these and the hæmoglobin of the blood. For determining the latter factor we have at present no accurate method. For clinical purposes the examination of all three things may give useful results, but the observations hitherto made are too few to give us the normal conditions in various diseases. As examples of some of the facts discovered by the authors in patients with valvular lesions, especially uncompensated ones, they found an abnormally high color with diminished iron and variable number of corpuscles; a high color was usually found in icterus, diabetes, and Graves' disease, with a low iron estimate and normal blood-corpuscles; the color strength was usually diminished in chlorosis and other anæmias, but the iron was higher than one would expect from the color. There were, however, cases with relatively high color-strength in comparison with the iron. In leukæmia, especially in severe cases, there was greatly diminished iron, but the color was not especially altered.

Acute Œdema of the Lung after Thoracocentesis.—ORTNER (*Wiener klinische Wochenschrift*, No. 44, 1899) has observed two cases of this kind, and has investigated their cause. In both cases there was absolute immobility of the heart, with adhesions of the pericardium to the heart and pleura or mediastinum, and in one case a fibrous mediastinitis. This latter condition the author looks on as an essential factor in the production of the fatal œdema, and he admits at the same time the well-known view that another factor is the abnormal permeability of the bloodvessels of the lung. The importance of the former cause was realized by some of the earlier writers, but among more recent ones only by Kovacs. Nevertheless, a search of the literature shows at least a dozen cases, quoted in the original, in which immobility of the mediastinum was present; and the fact is important to recognize in practice. Before puncturing the thorax it is necessary not only to investigate the functional condition of the heart, but also to bear in mind the possibility of an adhesive pericarditis or fibrous mediastinitis. The contents in suspected cases should be slowly emptied, only small quantities removed, and the operation suspended at once if severe coughing occurs.

On the Etiology and Symptomatology of Goitre.—ADAMI (*The Montreal Medical Journal*, January, 1900, p. 1), after dealing at considerable length with the more important theories that have been advanced to explain the etiology of goitre, gives the following conclusions:

1. That the causation of ordinary endemic simple goitre is directly associated with the water habitually drunk by the subjects of the condition.
2. That no single constituent or contamination has so far, despite extensive search, been found common to the waters of goitrous districts.
3. That the peculiar epidemics at times recorded, coupled with the lack of discovery of chemical or toxic cause, appears to indicate miasmatic—*i. e.*, microbic causation
4. That if it exists the microbic agent is yet to be discovered.
5. A long series of forms can be made out from, on the one hand, those showing well-marked goitres with dulling of intellect and bodily habit approaching to the myxœdematous type, through goitres presenting no generalized disturbance, save occasionally such as may be attributed merely to pressure upon the surrounding organs, to other forms of ordinary goitre showing symptoms of the same order as those seen in exophthalmic goitre, to cases of true exophthalmic goitre, and, finally, to cases showing no enlargement of the thyroid but certain of the general symptoms which are peculiar to Graves' disease.

Adami then proceeds to discuss more minutely the relationship between ordinary and exophthalmic goitre. The French writers in the consideration of exophthalmic goitre refer to the "formes frustes"—incomplete forms. In America, W. H. Thompson, of New York, has laid particular stress on this class of cases. It includes those cases characterized by presenting to a greater or less degree the remarkable symptom-complex of exophthalmic goitre, without, however, any primary evidence of enlarged thyroid—exophthalmic goitre without exophthalmos and without goitre. These cases seem to form a connecting link between simple and exophthalmic goitre.

Adami states that anatomically we have every indication that the common colloid goitre is pre-eminently a condition not so much of hyperplasia and overgrowth of the specific thyroid tissue as of retention of glandular secretion. Accepting this view we are able to recognize the possible development of the following series of conditions:

1. Disturbance of the thyroid so extensive as to lead to atrophy of the gland tissue, with the complete symptoms of cretinism (when occurring in the young) and of myxœdema (in the adult).

2. Disturbances insufficient to cause destruction of the gland tissue, but leading to arrest of discharge of the specific secretion from the follicles and heaping up of the same throughout the whole organ—generalized colloid goitre with myxœdematous or cretinoid symptoms.

3. Localized disturbances of the above nature, the remaining portions of the gland continuing to perform their functions normally; nodular goitre with absence of general symptoms, but with possible symptoms due to pressure of the enlarged portions of the gland upon the surrounding organs.

4. Localized disturbance leading to the heaping up and retention of colloid material in certain lobules of the thyroid, but with, in addition, the occasional occurrence of nervous stimulation or altered vascularity of the gland, whereby increased absorption or discharge of the retained material into the circulation is favored. Ordinary nodular goitre with paroxysmal dyspnœa, paroxysmal tachycardia, and other transient symptoms of hyperthyroidism, or of Graves' disease.

5. Supervention of increased discharge of thyroid secretion into the economy in a gland which is already the seat of ordinary retention goitre: secondary Graves' disease—*i. e.*, persistent tachycardia and other classical symptoms of Graves' disease following upon an ordinary goitre.

6. Increased activity of the thyroid gland with hyperplasia and enlargement of the gland: primary Graves' disease with accompanying enlargement without retention and exophthalmos.

7. Relative or absolute increased activity of the thyroid gland without at first any recognizable enlargement of the organ: formes frustes of Graves' disease.

Adami believes, however, that the essential cause of Graves' disease differs from the essential cause of ordinary goitre, and that Graves' disease in itself primarily depends upon some nervous or other stimulus acting upon the thyroid gland and leading to increased activity and increased secretion. The sudden liberation of some of the retained secretion is best calculated to explain the paroxysmal disturbance of the "Graves'" type often met with in the course of ordinary simple goitre, as again does sudden increased discharge or absorption explain the disturbances seen in the course of Graves' disease itself, as well as the dangerous and sometimes fatal results following the operative handling of the diseased glands.

Chronic Myocarditis with Cardiac Aneurism in a Child.—Rosenstein (*Zeitschrift für klinische Medicin*, Band 39, p. 142) has observed a case of this kind which is interesting not only on account of its rarity, but also on account of its possible dependence on tuberculosis. The patient was a boy, aged eleven years, who died shortly after an operation for gluteal abscess. As there were no clinical indications of heart disease, death was attributed first to embolism of the lung. However, on autopsy the pericardium was found adherent over the apex of the left ventricle and the left edge of the heart. The left ventricle was dilated, globular, and slightly aneurismal at the apex. At this part the muscle was separated by lines of fibrous tissue, and there was a fibroid scar in the endocardium, gradually thinning out into the normal tissue. The valves and coronary arteries were normal. There were tubercles in the lungs and tuberculous infarcts of the left kidney; tuberculous coxitis with extensive destruction of the pelvis and head of the femur. Microscopically the focus of myocarditis showed old chronic interstitial changes in which specific tuberculous lesions could not be recognized, although 600 sections were examined. Nevertheless, the author thinks the condition was originally tuberculous. Acute infectious diseases and hereditary syphilis could be excluded, and it seems most probable that the disease had begun in the pericardium and the inflammation extended to the myocardium and endocardium, and there, in the most frequent seat of a cardiac aneurism, had led to the principal changes. The author was able to find only three cases in the literature in which chronic interstitial myocarditis of tuberculous origin was observed in childhood. In these cases the alterations in the walls had not gone so far as in the present case. Clinically the lesions are interesting as having assisted in causing death from chloroform.

The Reaction of Leucocytes to Guaiac.—BRANDENBURG (*Münchener medicinische Wochenschrift*, February 6, 1900) calls attention to the guaiac test for leucocytes. His statement that it is not used in the diagnosis of pus in the urine as much as he thinks it deserves is based on forgetfulness of the fact that the centrifuge and microscope, essential in the examination of urine in any case, make the chemical test altogether unnecessary. The author's discussion of the cause of the reaction is interesting—namely, that it depends on the oxidizing effect of nucleoproteids in the pus-cells. It may be, however, that the reaction is due to a fermentation which could not be separated from the other substances. This point deserves further investigation. He has also studied the relation of various cells and extracts of cells on guaiac and finds that the nucleoproteids of the liver, spleen, and thymus are all capable of breaking down hydrogen peroxide, but do not turn guaiac tincture blue. Only one tissue of all that he examined was able to produce the same reaction with guaiac as pus—namely, bone-marrow. Leukæmic blood, even in the smallest quantities, in marked cases turns guaiac tincture blue. In making the test two or three drops of blood are diluted with water and filtered. The filter is washed several times, and then a few drops of the tincture added. In one case of myalogenous leukæmia 0.04 c.cm. of blood gave a deep blue color. Tissues from a case of myalogenous leukæmia treated with guaiac tincture showed a deep blue in all the vessels, so that they looked as if injected. The author has not been able to satisfy himself that all leucocytes are concerned in the guaiac reaction or only those of certain groups, but from his work hitherto he thinks it probable that only the leucocytes derived from bone-marrow are concerned. This part of the work especially is worthy of control investigation.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO THE UNIVERSITY HOSPITAL;

ASSISTED BY

ALFRED C. WOOD, M.D., AND C. L. LEONARD, M.D.,

INSTRUCTOR IN CLINICAL SURGERY, UNIVERSITY OF PENNSYLVANIA; ASSISTANT SURGEON, UNIVERSITY HOSPITAL.

ASSISTANT INSTRUCTOR IN CLINICAL SURGERY IN THE UNIVERSITY OF PENNSYLVANIA.

Tuberculous Disease of the Kidney.—DAVID NEWMAN (*The Lancet*, February 24, 1900) divides tuberculous disease of the kidney into three clinical forms:

1. Acute miliary tuberculosis.
2. Local tuberculosis, or renal phthisis.
3. Tuberculous or caseous nephritis.

All these varieties are due to the presence of tubercle bacilli and to an infective process resulting therefrom, but the channels through which the virus reaches the kidneys and the methods by which local infection takes place vary in different cases.

Two conditions are necessary to the establishment of renal tuberculosis—the presence of a suitable nidus and the conveyance of the specific organism to the part. The writer calls attention to the important clinical fact that tubercle bacilli carried by the blood to the kidney may be eliminated without any morbid change. From this it is evident that tubercle bacilli in the urine are not a positive evidence of tuberculosis of the urinary organs, but are positive proof of a tuberculous lesion somewhere in the body. When the kidney eliminates these bacilli without itself becoming involved it must be assumed that either the quantity carried to the organ at a given time is too small, or that the virulence of the microbes is insufficient to overcome the normal preventive power of the renal tissue and to produce the specific pathological effect. The natural power of the renal tissue to destroy micro-organisms may be rendered less effective by malformations of the organs or by disease. Hence it is that Bright's disease, cystic degeneration, amyloid degeneration, and congenital malformations and displacements all tend to make the kidney more liable to septic and tuberculous disease. Acute febrile diseases are also predisposing causes.

The kidneys may be invaded in four different ways: 1. By the blood-stream (*a*) the tuberculous particles may be so small as to be stopped only in the ultimate capillaries, where they give rise to numerous miliary deposits (in such instances the blood-stream becomes contaminated while passing through tissues or organs foreign to the urinary apparatus); or (*b*) tuberculosis may arise from infective emboli passing into a branch of the renal artery, the tuberculous virus becoming disseminated over the area of its distribution.

2. By invasion along the lymphatics of the kidney from foci in the lower urinary tract. 3. By contagion along the lumina of the excretory ducts. 4. Spreading to the kidney by continuity from other organs. It must, however, be borne in mind that while primary infection is conveyed to the kidney by one of these channels the infective process becomes more complicated as the disease advances; indeed, the mode of extension comes to involve a combination of the processes just mentioned.

Infection by the blood-stream may take place either through the capillaries (acute miliary tuberculosis) or by tuberculous embolism of the arteries.

Ascending renal tuberculosis, or infection by invasion along the lymphatics of the kidney from foci in the lower urinary tract, is by no means uncommon. Ascending infection may also take place along the lumen of the excretory duct, as is occasionally observed in the conveyance of septic infection. In some cases the whole route of infection may be traced from a lesion on the mucous surface of the bladder along the ureter, the pelvis, and into the uriniferous tubules of the pyramids. In the bladder and ureters the tuberculous process begins by the formation of the tubercle in the mucous membrane, and these, by breaking down, form the so-called "lenticular ulcers," which are characterized by a flat base covered by caseous matter and sharp, rugged borders within which little miliary nodules are situated. The ulcers are at first circular, usually superficial. Their edges are slightly raised and are surrounded by a pale anæmic zone set in a deeply hyperæmic mucous membrane. In the bladder these ulcers frequently coalesce, forming larger ones of irregular outline. Their favorite seat is the trigone and fundus of the viscus.

The comparative frequency of tuberculous disease of the kidney may be judged by the following statistics, quoted by Roberts. They embrace both primary and secondary deposits, the latter being found, especially in children, by far the most frequently. Of 1317 tuberculous subjects examined in the Pathological Institute of Prague (out of a total of 5000 bodies) tubercle in the kidney was found 74 times, or in the proportion of 5.6 per cent. of tuberculous subjects. Among 315 tuberculous children Rilliet and Barthez found tubercle in the kidneys 49 times, or in the proportion of 15.7 per cent. Dickinson also alludes to the relative frequency of renal tuberculosis in children and in adults, and in a table compiled from the post-mortem records of St. George's Hospital and the Hospital for Sick Children, Great Ormond Street, he shows the frequency of tuberculous formation in the kidney and other organs in 600 post mortem examinations, the subjects in the one 300 being under the age of twelve years, and those of the other 300 twelve years and upward. Of the former group 49, and of the latter group 17, suffered from tubercle in the kidney. These results correspond so closely with those of Rilliet and Barthez that there can be little doubt that renal tuberculosis in one form or another is specially a disease of early life, but whether the renal lesion is a secondary or a primary one is not shown in the statistics just referred to. Dickinson does not distinguish between the two forms, miliary and caseous; for "the miliary," he says, "become caseous as they enlarge, so that although in some cases there may be only one or only the other, yet they are continually intermixed and inseparable as different results of the same process." From the surgeon's stand-point it must appear, however, very important to distinguish between a disease which involves the whole system and another which primarily attacks an individual organ or part of an organ, even although they are histologically the same pathological process. With the distinction just referred to in view, Morris shows, by an examination of the records of the Middlesex Hospital, that of the 40 cases of tuberculous kidney met with in 2610 necropsies, 29 were miliary (secondary) and 15 were strumous (primary). Of the 29 cases of miliary tuberculosis, 18 were males and 11 were females, and in 28 out of the 29 cases both kidneys were diseased, while in the 15 cases of primary renal tuberculosis (9 males and 6 females) both kidneys were diseased in 8 patients. Another point worthy of note is the different periods of life at which the two forms of disease occur. In the miliary (secondary) tuberculosis 12 cases occurred in persons under ten years of age, 8 in persons between the ages of ten and thirty years; 6 in persons over thirty years of age, and three in persons whose ages are not stated. In the scrofulous (primary) tuberculosis no cases occurred in persons under eleven years of age, 5 occurred in persons between the ages of eleven and thirty years, 7 in persons over thirty years of age, and 3 in persons whose ages are not stated.

Symptomatology. In all cases of pyuria, with renal symptoms associated with rapid emaciation, anæmia, elevated evening temperature, and rapidly progressing marasmus, tuberculous disease should be suspected. The urine is acid. As a rule, there is not much pain in the kidney, nor is it greatly enlarged.

Polyuria is generally one of the first symptoms, and is probably due to hyperæmia produced by the presence of bacilli or their toxins. Hæmaturia is seldom marked, but it may be the initial symptom. The detection of tubercle bacilli in the urinary deposit is of great value. It is important to determine whether one or both kidneys are involved.

Prognosis. The prognosis in renal tuberculosis is unfavorable. It is especially grave when the disease extends to the ureter and bladder or to the other kidney.

Treatment. Nephrotomy should be practised if the disease is limited to a small area or has formed a cavity which can be easily drained. If, however, the wound fails to heal and the discharge continues removal of the kidney must be resorted to. Partial excision is probably not a suitable operation for tuberculous lesions. Nephrectomy should be the operation of choice when the disease extends over a large area and also in cases where nephrotomy has failed, it being understood, of course, that the general condition of the patient will permit of this operation.

Renal Papillectomy.—E. Hurry Fenwick (*Brit. Med. Journ.*, February 3, 1900) under the above title offers a contribution to the study of painless unilateral renal hæmaturia in the young adult. This condition has been recognized only since the introduction of the cystoscope. A number of such kidneys have been exposed and opened without discovering the origin of the hemorrhage. From his experience in two recent cases, Fenwick is convinced that our ignorance of the actual cause of the hemorrhage is entirely due to a faulty operative technique. He has been forced to conclude that an examination with the finger is futile; and that if we propose to ascertain the origin of the bleeding we must open the pelvis itself and examine every part of it by means of a strong light (renal pelvoscopy).

He submits that in some at least of these cases the bleeding emanates from one of the renal papillæ and the mucous membrane clothing it; that the papillary part of the Malpighian pyramid is engorged, and that its papilla is covered with a plexiform mesh of dilated vessels (varicosity of the papillary plexus). He suspects this vascular change is due to a localized patch of interstitial nephritis impeding the circulation in the boundary layer of the pyramid, and thus preventing venous drainage of the papillary plexus. It may be that the vessels are actually altered in the same way that the entire circulation becomes affected in the advanced stages of bilateral interstitial nephritis. Be that as it may, the site of disease is apparent only on opening the renal pelvis. A vivid red papilla assuming the aspect of a tiny villous growth stands out in strong contrast to the pale papillæ around.

It is asserted that the removal of this vascular papilla with a sharp scoop is sufficient to arrest a renal bleeding which no drug can control.

Two cases are described in support of the author's views, both of which were cured by the operation of papillectomy.

Suture of Fractured Patella by an Improved Method.—R. Glasgow Patteson (*Brit. Med. Journ.*, February 3, 1900), after a careful review of the subject of the operative treatment of fracture of the patella, concludes from an analysis of recorded cases that the causes of failure might fairly be classified under two heads: (1) The adoption of subcutaneous methods, in which no effort is made to relieve the tension in the joint, due to the extravasation of blood and serum, and in which accordingly no certainty of accurate approximation of the bony surfaces can be secured; and (2) the use of unsuitable materials for suturing the fragments together, and a faulty method of performing the operation in cases where the open treatment was selected.

The proposed method is described in connection with the following case: A man, aged twenty-four, was admitted to the Hospital, November 11, 1898, having sustained a fracture of the patella on the previous day from a fall. The knee was greatly distended, very tense, and a transverse fracture in the lower third of the patella was present, the two fragments being separated about one inch. The limb was elevated, a posterior splint fitted, and evaporating lotions applied for three days. On the 14th, the swelling and pain having greatly lessened, the knee-joint was opened by a large U-shaped flap with the convexity downward. The U-shaped flap was adopted because it gives freer access to the broken fragments, and should a suture abscess or other accident to the skin-wound occur the joint is removed from the seat of the infection. When the joint was opened a number of clots were washed away with sterilized water. By means of a blunt periosteal elevator the bony surfaces were cleared. A single hole was then drilled in each of the two fragments for the reception of the wire suture. The wire had been specially prepared previously and was D-shaped of No. 16 gauge, and made of the softest silver. The wire was passed through the drill holes, the fragments cleansed and placed in proper apposition and the wire looped. The divided aponeurosis and periosteum were closely sutured with fine silk over the underlying wire. In this way the fractured surfaces were completely protected. The author regards this as one of the most important steps of the operation. The skin was closed, the wound dressed, and a light posterior splint applied. The convalescence was satisfactory in every way, and eight weeks after the operation the man was able to walk over two miles.

In connection with this operation the author especially emphasizes the following:

1. The advisability of delaying operation for a few days after the injury until the subsidence of the more acute symptoms in the joints.

2. The thorough clearing out of the joint, all the recesses of the synovial membrane being completely freed from clots, and the broken surfaces of the bone thoroughly cleaned. This can only be secured by the open operation.

3. The use of an easily-sterilizable suture strong enough to secure apposition by a single drilling, and so shaped as to render splitting of the bone an impossibility, and to prevent, in fastening it, the formation of a large and irritating loop.

4. The elevation and not the resection of the fibrous curtain and its subsequent accurate suturing over the embedded wire, forming an additional barrier underneath the skin-flap against infection or irritation.

5. The early commencement of passive movement, which is thus rendered feasible, and undoubtedly greatly shortens the period of disability following the fracture—a point of paramount importance to the class of persons most subject to the injury.

Gastrostomy by Franck's Method.—COLIN MACVICAR describes the following case (*Brit. Med. Journ.*, February 3, 1900): A woman, aged sixty-three years, sought advice in June, 1898, on account of difficulty in swallowing. One brother had died at the age of fifty-three from carcinoma of the stomach. The family history was otherwise negative. Fifteen months previously some difficulty was experienced in swallowing, and for the past year she was able to take fluids and semi-solids only. In January, 1898, pain was experienced over the lower end of the sternum on swallowing. A soft rubber stomach-tube was arrested at the cardiac extremity, but passed into the stomach by continued steady pressure.

Franck's method of gastrostomy was carried out. The patient survived four months, which was two or three months longer than the average expectation of life.

Regarding the selection of methods, the author states that those of Witzel and Kader are more suitable where one desires a temporary fistula, as the opening soon closes on withdrawing the tube, while those of Franck and Marwedel are to be preferred in malignant cases where a permanent fistula is desired. The methods of Witzel and Franck are practicable only where little or no cicatricial contraction of the stomach exists.

On Surgical Disinfection.—A. J. OCHSNER describes in the *Chicago Medical Recorder*, February, 1900, the methods of surgical disinfection employed at the Augustana Hospital, Chicago. The following conclusions give a summary of his views:

1. (*a*) Theoretically it is almost impossible absolutely to disinfect the skin of the patient and the hands of the operator. (*b*) Practically it is one of the

easiest and simplest tasks to obtain a degree of surgical cleanness that will insure primary wound-healing.

2. (*a*) Theoretically strong chemical disinfectants are indicated for the purpose of disinfecting the hands. (*b*) Practically careful washing with the mildest, viz., soap and water and alcohol, is absolutely sufficient and very much safer for the patient, because hands roughened by the use of the strong antiseptics are much more likely to become hopelessly septic than hands which are covered with smooth, healthy skin.

3. (*a*) Theoretically it is extremely simple to keep the hands aseptic after they have been rendered so. (*b*) Practically there is no more difficult task in any clinic than to keep all interested hands clean after they have been disinfected.

4. (*a*) Theoretically sutures passing through the skin and the deep tissues underneath are a menace to the patient, because they form a direct communication between the skin which contains staphylococci and the deep tissues which are primarily sterile. (*b*) Practically these stitches never cause an infection, unless drawn too tightly, in which case the resulting pressure-necrosis is the cause of the mischief, because it furnishes these micro-organisms dead tissue to thrive upon.

5. (*a*) Theoretically catgut sutures and ligatures are objectionable. (*b*) Practically, if applied properly and not tied too tightly by a clean surgeon with clean assistants, they are absolutely satisfactory and not objectionable.

6. (*a*) Theoretically it is as safe to operate upon clean cases after dressing suppurating wounds as at any other time. (*b*) Practically surgeons who follow this practice always have a great amount of wound-infection on account of accidental contamination of something coming in contact with the wounds.

In order to have wounds heal without suppuration, he believes the following conditions should be considered :

1. The surgeon, his assistants, and nurses must be habitually clean, and the skin of their hands must be free from irritation and roughness.
2. Their attention should constantly be directed toward the prevention of accidental infection.
3. The surgeon and his assistants should be careful not to breathe or speak into the wounds.
4. Tissues should not be exposed to unnecessary traumatism.
5. Sutures should not be tied tightly enough to cause pressure necrosis.
6. A reasonable system should be employed, so that everyone concerned can assist intelligently in preventing infection.

A New Method of Treating Varicose Ulcers of the Leg.—BARDESCU (*Centralblatt für Chirurgie*, 1899, No. 28) reports two cases of chronic indolent and indurated ulcer of the leg which he treated by section of the long saphenous vein and stretching of the common peroneal nerve. This treatment he bases upon the nerve pathology of these lesions, which shows them to be phlebo-neuro-trophic in character.

The result of the nerve-stretching was a local anæsthesia in the area of the ulcer and the distribution of the nerve. This ensued immediately, and was followed by a rapid disappearance of the induration, the formation of healthy granulations, and the final development of a healthy, strong scar. The worst case, in which there were ulcers on both legs that had existed for over seven years and defied all treatment, healed in twenty-seven days. The patient was seen a year after the operation and had returned to his former life and work, and yet the scar showed no tendency to break down or the condition of varicosity to return.

The portion of nerve to be stretched is entirely dependent upon the area of skin involved in the varicosity and ulceration.

Urethro-prostatic Infection.—NOGUES and WASSERMAN (*Ann. Mal. Genito-Urinair.*, July, 1899) have made a careful study of this subject and arrive at the following conclusions:

There are cases of urethro-prostatic infection in which the infecting agent is a diplococcus which is readily decolorized by Gram's method and has a number of points of resemblance with the gonococcus.

2. Although these diplococci decolorize by Gram's method, they have not the morphological characteristics of gonococci, and no cultures are exactly identical with the microbe they have cultivated, except possibly that described by Hogge.

3. These diplococci can be clearly differentiated from the gonococcus by the characteristics of the culture. This goes to support the contention which these authors have always held that the gonococcus has a marked individuality which makes it possible to distinguish it always from the forms that resemble it, and that this in nowise justifies the belief in pseudo-gonococci.

Two Recent Operations on the Gasserian Ganglion by the Hartley-Krause Method.—THOMAS (*British Medical Journal*, October 21, 1899) reports two cases of successful operation upon the Gasserian ganglion and the second and third divisions of the fifth nerve for neuralgia. The neuralgia had lasted two or three years in spite of treatment. Both were operated upon in one sitting, and in one the bone was replaced. In the other the middle meningeal artery was torn. This taught the operator to remove the posterior limb of the bone before attacking the anterior, where the artery is liable to be injured. The deformity is lessened by replacing the bone.

In cleansing the scalp he used a depilatory powder that has as its active ingredient sulphite of barium. It destroys the hair, and with it the superficial layer of skin. All can be removed with a spatula. It is a very thorough antiseptic method and promotes primary union.

Instead of tearing out the distal portions of the severed nerves—a method which was found impracticable to any great extent—the author prevented future regeneration of the nerve-trunks by blocking up the foramen rotundum and foramen ovale with Hartley's wax. The advantages of the wax are: 1. The ease with which it can be used. 2. The firmness with which it adheres to the bone. If this wax does not suffice, the author advocates the employment of a more lasting material, a mercury amalgam, used by dentists to fill teeth.

Terminal Hæmaturia and its Treatment.—POSNER (*Therap. der Gegenwart*, 1899, No. 5) recognizes by this term a form of hæmaturia where the first portion of the urine is clear, followed in the terminal portion by intense pain and the discharge of a few drops or even a larger amount of pure blood.

Very frequently its cause is a posterior urethritis of gonorrhœal origin, which has included the prostate. The ordinary methods of treating acute catarrh of the bladder should be employed in these cases. Rest in bed, regulation of the diet, and stools. Internally, ol. santali., but without warm sitz baths, warm compresses, or mineral waters. Only in the most resistant cases should local treatment be applied. In chronic gonorrhœa the local treatment should be commenced earlier.

Terminal hæmaturia is further an evidence of the presence of foreign bodies, as calculi, or of tumors, or the early stages of senile prostatic hypertrophy, and very frequently of tuberculosis of the bladder. In the latter cases all local treatment is avoided and a symptomatic treatment instituted. Urotropin is generally useless, and it is better to avoid sublimate solutions, even 1:30,000. Hæmostatic drugs have very little value; hydrastis is the best. Frequently the passing of a catheter will suffice to still the bleeding by reducing the congestion. The local use of tannin of the iron salts is to be avoided.

PEDIATRICS.

UNDER THE CHARGE OF

LOUIS STARR, M.D.,

OF PHILADELPHIA,

AND

THOMPSON S. WESTCOTT, M.D.,

OF PHILADELPHIA.

The Etiology of Dysentery.—ESCHERICH (*Centralblatt für Bakteriologie*, 1899, Band xxvi., No. 13, S. 385), referring to a recent publication of Shiga and Celli upon the etiology of dysentery, reviews the communication which he made upon this subject at the Congress of Carlsbad, when he described a number of cases under the name of coli-colitis, which he considers identical with those observed and described as infectious colitis two years ago by Finkelstein.

Escherich's cases appeared in epidemic form during the winter of 1894–1895. Fifteen children were affected, seven of whom died. A second epidemic occurred in 1896, and cases were seen again in 1898. The symptoms were those of an acute infectious inflammation of the mucosa of the large intestine, beginning abruptly with fever and collapse, the stools containing mucus, blood, and pus, not copious, but frequent, and attended with rectal tenesmus. The abdomen was retracted and the contracted descended colon could be easily palpated. Later the course was apyretic, with tendency to relapse. From the stools almost pure culture of the colon bacillus was obtained. Autopsy showed the lower portion of the large intestine contracted, thickened, its mucous coat swollen, congested, and covered with ecchymoses, in places presenting actual follicular ulcerations.

The symptomatology and the anatomic lesions were therefore those of a catarrhal dysentery such as have been described by Heubner. In these cases, as in those which have been more recently described by Shiga and Celli, the serum of the patients produced agglutination of colon bacilli obtained from culture of their intestinal discharges. Escherich therefore concludes that the cases of dysentery he observed were provoked by colon bacilli.

Treatment of Typhoid Fever in Children.—GLÉNARD (*Revue mensuelle des Maladies de l'Enfance*, January, 1900, p. 31) makes an interesting contribution to the discussion that has been raised in recent years as to the efficacy of the Brand system of treatment, restricting his study to the application of the bath treatment to the disease in children.

He first refers to the statistics, and shows that the mortality of cases treated by purely medicinal means is about 15 per cent., and that when the bath is employed as a succedaneum to a medicinal treatment, the figures are reduced to 11 per cent., while under a systematic bath treatment the mortality falls to 2.5 per cent. Even when treated by the mixed method, he says, typhoid fever in the child is a grave malady, because this ratio, which is an average one, can in certain cases, despite mixed treatment, reach double or triple the figures given; and if the epidemic is severe, and especially with children under five years of age, the mortality reaches the figures that obtain in cases treated by medicinal means alone. Moreover, he states, with the mixed method the prognosis remains uncertain, there is decided tendency to complications, even in the benign cases, the duration is long, convalescence is slow, and sequelæ may leave permanent effects.

On the other hand, he believes, with the systematic bath treatment, the mortality of which varies little from the average figures stated, and never exceeds a maximum which is very low, the prognosis is good from the first days of the disease, the complications are reduced to a minimum, convalescence is short, and sound health is assured.

Collapse, he states, is never observed among children by physicians who apply the systematic bath treatment to typhoid fever any more than by those who treat in the same way infantile pneumonia, a disease in which the heart is much more seriously menaced. The cause of collapse is to be attributed neither to too low a temperature of the bath, nor too prolonged a duration of the exposure within the proper prescribed limits as understood by the physician; but it is rather to be attributed to too high a temperature of the bath or to the cold bath given at too advanced a period of the disease without the medicinal help indicated by the state of the heart.

In the mixed treatment, he concludes, collapse may occur, because it is not the methodical treatment by the cold bath, and because the cold bath is not the basis, the essence, of the treatment.

Leucocytosis in Whooping-cough.—DE AMICIS and PACCHIONI (*Revue mensuelle des Maladies de l'Enfance*, January, 1900) have observed that the blood of pertussis patients constantly shows a leucocytosis which reaches a maximum in the spasmodic stage. It begins in the first days of the disease, and is occasionally prolonged for some time after the cessation of the typical paroxysms. It is largely at the expense of the lymphocytes.

In no other disease of the respiratory passages is a similar or so marked a leucocytosis encountered. The constancy of this feature of the disease suggests it as a valuable aid in early diagnosis, when prophylaxis may yet be possible.

The authors consider that this phenomenon is further evidence in support of the infectious origin of whooping-cough, were such needed at the present day, and that the important part in its production played by the leucocytes indicates a very active participation of the tracheo-bronchial lymphatic system.

The Pathogenic Action of the Proteolytic Bacteria of Milk.—JEMMA (*Revue mensuelle des Maladies de l'Enfance*, January, 1900, p. 20) makes the following résumé of the conclusions of a study under this title:

1. The ferments of casein which are found most frequently in milk belong to the group of the bacillus subtilis; this has no pathogenic influence upon animals experimented upon in the laboratory.

2. There may be encountered among these ferments of the casein certain microbes belonging to the group of the bacillus mesentericus vulgatus; among them are at times found certain bacilli possessing pathogenic properties, which explains the effect upon the intestinal mucous membrane produced by the ingestion of large quantities of these germs. Introduced within the peritoneum, into the blood, or under the skin, they produce no effect. From this it appears that the pathogenic action of these bacteria depends not upon toxins secreted by them, but upon disturbances they provoke in the intestinal contents and in the mucous membrane of the intestinal tract.

3. The bacillus butyricus of Hüppe and other varieties of this group isolated from milk are nearly always devoid of pathogenic action.

A Case of "Scurvy-rickets" in a Boy of Twelve Years.—EDMUND OWEN (*British Medical Journal*, December 23, 1899, p. 1719) records an exceedingly interesting case of scurvy observed in a boy of twelve years who had been allowed to live upon a diet entirely destitute of fresh fruit and vegetables. He exhibited marked rhachitic symptoms. The rosary was quite characteristic and the epiphyses of the radii were distinctly enlarged. Whether this condition had existed in infancy was unknown. The patient was a school-boy living in the country. He had apparently been always healthy, though nine months before he had been in the hospital for division of each tendon of Achilles. From the time of the operation he had been feverish and fretful, and the parents had given way to him on all points. On admission to the hospital, under Mr. Owen's care, he was very anæmic and sickly and had a wrinkled face. The knee-joints were swollen, some fluid was present; the ankles and feet were swollen and œdematous. The height was three feet eleven inches, and the weight only thirty-nine and one-half pounds. The teeth were slightly loosened, the gums spongy and occasionally bleeding when he ate hard food. The abdomen was swollen, the liver and spleen slightly enlarged. The urine was alkaline, specific gravity 1030, and contained a considerable amount of blood. The heart and lungs were healthy. As regards the diet, his mother said that he persistently refused to eat vegetables and fruit, and that he took little milk. At breakfast he had egg or bacon or some such thing, with bread and cocoa; at dinner meat or fish, with occasionally a little potato and more cocoa; later in the day he had tea and bread and butter, with occasionally potted meat; and at supper bovril or cocoa.

Subperiosteal effusion was present at the lower end of the tibial diaphyses, over each tarsus and the lower end of the femora.

After a sojourn of ten days in the hospital upon a diet of fresh fruit and vegetables, beef jelly, sweetened lemon juice, milk, meat, and bread and butter he was greatly improved.

The case is of great interest on account of the age of the child, which is far advanced beyond that at which infantile scurvy is ordinarily encountered.

[The origin of the stigmata of rickets in this case is doubtless to be assigned to the period of infancy, and there seems to be no evidence in the history that there was any closer relationship between the rhachitic lesions and the scorbutic symptoms. From this point of view the case should be classed rather as a scurvy of ordinary type than as an instance of infantile scurvy or "scurvy-rickets," as English writers are disposed to call it, occurring at an advanced age.—ED.]

Aneurism of the Aorta in a Child.—ROGERS (*Pediatrics*, August 15, 1899) records a rare instance of aortic aneurism in childhood. The patient was a girl, aged ten years, with a good family history, very anæmic, and showing a loud, rough, systolic murmur all over the cardiac area, loudest over the pulmonary region. The apex was displaced one inch outward, and a distinct fremitus could be felt. The progress of the case differed from that of ulcerative endocarditis. The temperature was constantly elevated, and the murmur increased in loudness. The urine was normal. Death occurred suddenly from cardiac failure. At the post-mortem the pericardium was found to contain some fluid with flakes of recent lymph in it; the left ventricle was greatly hypertrophied, and the aortic valves glued together by large vegetations. About half an inch above the right side of the anterior semilunar valve of the aorta was a rugged hole, the opening of a small aneurism, which was about the size of a cob-nut and was partially filled with clot. The other organs were healthy. The aneurism was not in the position of the obliterated ductus arteriosus.

The Composition of Backhaus' Milk for Infant Feeding.—KOLISKO (*Arch. f. Kinderheilkunde*, Band xxvi., Heft v. und vi.) describes the preparation of Backhaus' food as follows: Mixed milk is passed through the centrifuge and the cream separated. The separated milk is exposed to the action of a mixture of rennet, trypsin, and sodium bicarbonate, which are combined in such proportions that the trypsin will have converted 30 per cent. of the casein into soluble albumin at the end of thirty minutes. By this time the rennet coagulates the balance of the casein, and thus arrests the action of the trypsin. The temperature is then raised to 80° by the introduction of steam, and this temperature is maintained for five minutes. The milk is then strained through cloths, mixed with half its volume of water, one-fourth the volume of cream, and the necessary amount of milk-sugar. This mixture is then bottled in vials holding 125 grammes (four ounces) and sterilized.

A second grade for older children is obtained by mixing equal parts of the predigested milk and water with half the quantity of cream and with milk-sugar. This is supplied in bottles holding 200 grammes (six and one-half ounces).

A third grade, which imitates cow's milk in composition, and is supplied in bottles holding 300 grammes (ten ounces), is prepared by a similar method of modification.

The first grade shows the following composition: Fat, 3.1; sugar, 6.0; casein, 0.6; albumin, 1.0; ash, 0.4. The second: Fat, 3.2; sugar, 5.4; casein, 1.8; albumin, 0.3; ash, 0.4. The third grade shows: Fat, 3.3; sugar, 4.8; casein, 3; albumin, 0.5; ash, 0.7.

This preparation has been tried by Frühwald in twenty cases, the histories of which are given in the paper. All excepting six were under observation for more than two months. When first put upon this mixture all were suffering from different forms of digestive trouble and from malnutrition; some were suffering from severe marasmus, and most of them passed through some other acute disease while under observation. Under one or other of these mixtures average daily gains of 18 to 30 grammes were made (about one-half to one ounce). In private practice and in healthy children a daily gain of 50 grammes (one and one-half ounces) was said not to be rare.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Euphthalmin.—Dr. Albert B. Hale states that in using mydriatics for diagnostic purposes three factors must be considered: (1) The least desirable is the action of the drug on the ciliary muscle, for however valuable this may be in estimating errors of refraction, it is always intensely disagreeable, often dangerous to the patient, and certainly unnecessary for the study of the liver or fundus. (2) The anæsthetic effect, most marked in cocaine, least so in atropine, which is of no use in diagnosis. (3) The most important is the dilatation of the pupil. To obtain the first effect we use atropine, scopolamine (hyoscine), duboisine, homatropine or cocaine, named in the order of their strength. To produce local anæsthesia cocaine and eucaine have disadvantages which have been overcome by halocaine. To produce the third effect we have had hitherto to resort either to atropine, which is so powerful as to be dangerous, and so lasting as to be disagreeable, or to homatropine, too closely allied to atropine for any practical advantage, or to cocaine, which proves annoying by its slight mydriatic effect or by its primary desiccation of the cornea and subsequent hyperæmia of the conjunctiva. To produce pupillary dilatation without anæsthetic effect or alteration of accommodation the euphthalmin meets the requirements of the practitioner. In 5 or 10 cent. solution it produces no subjective symptoms. It causes only mydriasis, pronounced, but of short duration. Its effect appears earlier in youth than in old age. It is apparently non-poisonous.—*The Chicago Medical Recorder*, 1900, No. 2, p. 126.

Fluid Extract of Lemon in Malarial Prophylaxis.—DOTT. EUGENIO DIMATTEI notes that after continuous administration of this remedy to the *personnel* of a railway traversing a malarial district, the attacks of malaria regularly diminished, the fever was milder, and its duration shorter. The percentage of instances of malaria per one hundred persons was in 1890–1894, 66; 1895–1898, 32; while in the year 1898 it was only 25.—*Gazzetta degli Ospedali e della Cliniche*, 1900, No. 3, S. 31.

Aneurism Treated by Subcutaneous Gelatin Injections.—DR. THOMAS B. FUTCHER quotes Lancereaux as follows: The gelatin solution is made by dissolving a drachm of white gelatin in six and two-third ounces of normal salt solution and sterilizing thoroughly at 180° F. The flasks are kept at 100° F. No pain should follow injection. With antiseptic precautions there is no local or general reaction. Absolute rest should follow injection, and palpation of the aneurism should not be practised. Injections at intervals of six to eight days; fifteen or twenty are necessary to effect a cure. Injections are to be made into the subcutaneous tissue of the thigh and never into the aneurism or near it. A proper diet is imperative, and a strict milk diet is preferable; fruits and leguminous foods may be permitted. Iodides and nitrites (vasodilators) are indicated. Three of five patients were cured. Those cured had sacculated aneurisms. The other two showed diffuse dilatation of aortic arch (Lancereaux). Conclusions from nine patients recently treated by this method are: 1. In no instance was the aneurism cured, though diminution in size in one patient was remarkable. 2. In seven of the nine patients there was marked diminution in the subjective symptoms referable to the pressure of the aneurism. 3. The subcutaneous injection of gelatin solution does not materially increase the coagulability of the blood. 4. The injections are very painful, pain being most intense about six hours after injection. 5. There is frequently elevation of the temperature. Two to four hours after the injection there were distinct chills with temperature as high as 105° F. There was no local suppuration, and in only one instance did a local reaction follow. 6. Though the writer can report no patient cured, he recommends further experimentation with this method of treatment.—*Journal of the American Medical Association*, 1900, vol. xxxiv., p. 204.

Naphtalin and Oxyuris Vermicularis.—DOTT. AGOSTINO SORINI gives a preliminary dose of calomel, and then for a week twenty-two grains of the remedy each day. At the end of the second week no worms were found, and the feces were free from them during about two months. Care should be taken (1) that the remedy is pure; (2) to forbid fats and alcohol, in which it is soluble; (3) not to use a too large dose and to interrupt from time to time its administration to avoid untoward phenomena from kidneys, bladder, and eyes, such as have been pointed out by various observers.—*Gazzetta degli Ospedali e della Cliniche*, 1900, No. 6, p. 52.

The Treatment of Ulcers of the Leg.—DR. KARL STEINER recommends crurion (chinolin-bismuth rhadanate), which possesses the chemical formula of $(C_9H_7N.HSCN)_2\ Bi(SCN)_3$. This occurs as a reddish-yellow powder of a somewhat pungent odor, insoluble in alcohol, ether, and water. On cleansing the ulcer the powder is dusted on. Should the burning pain following its application be severe it may be diluted with an equal amount of starch. Under this treatment the ulcers rapidly heal and surgical interference becomes unnecessary.—*Therapeutische Monatshefte*, 1900, Heft 1, S. 22.

Bromoform.—MR. WILBUR L. SCOVILLE presents the following as a mixture containing practically no alcohol, susceptible of accurate dosage, and changes in dosage are possible without altering the proportion of the other ingredients: Bromoform, 1; tincture of tolu, 2; mucilage of acacia, 4; syrup, 8; peppermint water, 32. To prepare this the mucilage is placed in a bottle, an equal volume of syrup added, then the bromoform and tolu, in portions, shaking well after each addition. To this thin emulsion add the rest of the syrup and mint water, with agitation. The above formula contains two minims of bromoform in each teaspoonful. To eliminate alcohol absolutely the syrup may be employed in place of the tincture of tolu.—*Pediatrics*, 1900, No. 2, p. 76.

Therapeutics of Heroine.—DR. MORRIS MANGES describes the drug as a white crystalline, odorless powder, bitter and alkaline. It melts at 340° F., and is insoluble in water. Solutions are easily obtained by the addition of a few drops of an acid. Heroine, chemically, is morphine, in which both hydrogen-hydroxyl atoms have been replaced by the acetyl radicle $OC.CH_3$, thus forming the diacetic ester of morphine. Heroine hydrochloride is a neutral salt soluble in two parts of water. Except that its melting-point is much higher, its physiological properties are as for heroine itself. Triturated tablets are the best form for administration, or in solutions with a few drops of acetic acid. The initial dose should never exceed one-twelfth of a grain for weak individuals, and for aged patients the dose should be lessened; for children the same precautions are necessary as for morphine. When immediate results are requisite the hydrochloride given hypodermatically is satisfactory. Watery solutions are used, 2 per cent. solutions in doses of four to eight minims (twelfth to a sixth of a grain). For internal use the dose of the hydrochloride is somewhat larger. Both heroine and its salt can be given in combination with other drugs, the only incompatible being apomorphine. Alkalies must not be added to solutions of the salt. The drug has been found useful as an anodyne in neuralgia of the trifacial nerve, enteralgia, and hemicrania. After prolonged use the dose requires to be increased somewhat. No bad effects have been reported from its use even in advanced cardiac disease. In painful affections it is inferior to morphine and codein. In irritating lesions of the respiratory tract it is decidedly inferior to the other alkalies. In dyspnœic conditions heroine acts on the respiration as does digitalis on the heart. Asthma is much benefited. Sometimes expectoration is lessened, and Leo recommends the addition of iodide of potash. This combination is very effective. Hypodermatic injections of heroine hydrochloride cause no bad local effects if the usual precautions are observed. Injections were painless. Untoward effects followed in two instances—namely, nausea, depression, and vertigo, lasting a short time. Sedation following these hypodermatic injections is marked in a great variety of affections. The drug is useful in the cure of morphinism. It is substituted for morphine, which is wholly withdrawn, and then the dose of heroine is reduced gradually. No digestive disturbances follow. A few instances of constipation are reported, and for such patients half a grain of cascara sagrada may be added to each tablet. For its local soothing effect heroine can be applied topically on tampons in glycerin solutions or in vaginal suppositories (sixth to a quarter of a grain in cocoa butter). Pain is much lessened in a few minutes. The effect lasts a full day or more, though the tampon be retained but a few hours. In pertussis it is invaluable (Goldmann). In influenza heroine shortens the course and lessens the tendency to bronchopneumonia. It may be administered with a mild expectorant.—*New York Medical Journal*, 1900, vol. lxxi., p. 51.

Tannigen.—DR. CARL MANASSE claims excellent results from the use of this remedy in intestinal catarrh. For nurslings, two and one-half grains; for older children, four to five grains, three or four times daily, arrest the diarrhœa, and in three or four days the discharges become normal. Its use is claimed to be without untoward effects. Eighteen instances in support of this statement are cited.—*Therapeutische Monatshefte*, 1900, Heft 1, S. 27.

The Therapy of Cacodylic Acid.—DR. A. GAUTIER gives the following formula: Acid cacodylic, 75 grains (this to be exactly saturated with sodium carbonate); then add cocaine hydrochlorate, 0.5 grain; creosote (dissolved in 2 drachms of alcohol), 5 drops, and distilled boiled water enough to make 3 ounces and 1 drachm. This contains 0.75 of a grain of cacodylic acid in each 15 minims. It is recommended as a substitute for arsenical preparations, especially in phthisis. Subcutaneous injection is painless. All the objections to arsenic, as such, disappear, and in this latent, organic form it can be given, avoiding the various toxic effects resulting from a continued use of arsenic. In addition to the physiological action of arsenic when given in this form, a hyperleucocytosis (especially polynuclear) results, which rids the system of toxic bacteria. The red blood-cells are also increased prodigiously, oxidation is augmented, and thus the blood and tissues are constantly strengthened and renewed.—*Revue de Thérapeutique*, 1899, No. 13, p. 433.

Serotherapy in Tuberculosis.—DR. C. P. AMBLER recommends antituberculous serum in the incipient stage, and especially when there is no mixed infection. The use of the serum is contraindicated in general miliary tuberculosis, in extensive softening, high pulse, marked emaciation, or where there is an hereditary history. Relapses during treatment and afterward are less frequent than when patients are treated with creosote and allied drugs. Night-sweats are more easily controlled. Expectoration greatly increases during the first two weeks, and rapidly diminishes thereafter. When the disease is far advanced or cavity-formation is extensive the beneficial effect on the expectoration is absent. Injections were continued on an average of ten weeks among those patients discharged as cured. A local erythema in half the patients appeared about the point of injection. Rarely the eruption became general. After the first week no local disturbance followed the injections. When enlarged lymphatic glands are present increase in size occurs, and there is marked tenderness; if the glands are not caseous they slowly diminish in size after two weeks, and wholly disappear. A serious symptom is sudden syncope following the injection of the serum. It often lasts as long as two minutes, and occurs in 5 per cent. of all patients. The face is flushed; it is soon followed by pallor, cardiac weakness, nausea, and vomiting—symptoms probably due to the accidental injection of the serum into a small vein, and not to repetition of the injections at the same point. A recumbent position soon restores the patient, and there are no subsequent ill effects. The first injections do not exceed 3 minims, and are gradually increased to 7 or 8 minims; after some days 15 minims are given at a dose, rarely more. Injections are administered daily in the loose skin above the crest of the ilium, using a small hypodermatic needle. Fisch's antiphthisic serum T. R. gave the best results. Antistreptococcic serum, in addition, where there is mixed infection, has not been successful—not influencing the presence of streptococci, which often disappeared without this second serum, and remained in severe infections, though both sera were injected. The conclusion reached is that antituberculous serum is certainly useful in the incipient stage of pulmonary tuberculosis.—*Journal of the American Medical Association*, 1899, vol. xxxiii., p. 64.

Pulmonary Tuberculosis Treated by Aniline Inhalations.—DR. GIBERT gives the following formula: Crystallized carbolic acid, 22½ grains; boric acid and tincture of peppermint, 2 drachms each; pure white aniline, 4 drachms; distilled water, 3⅝ ounces. Deep inhalations of this mixture (from ten to twenty) are to be taken every half-hour, and as many as three hundred in a day. Several spoonfuls of the above mixture are placed in a flask arranged with tubes in such a way that the height of the fluid is not much above the tubes. Agitation of the flask emulsifies the fluid, and the air in the tubes is ready for inhalation. If irritation of the throat results, equal parts of borated water and aniline oil may be substituted. In addition, to cause a general antisepsis, thrice daily three to fifteen drops of aniline in a little water are administered. To keep the temperature regularly low, fifteen to twenty grains of acetanilid are given daily. This medication is indicated when the temperature reaches 99°. Following the inhalations cyanosis of the face and extremities was marked in one patient; the pulse remained slow; there was occasional vertigo. These symptoms soon disappeared. The beneficial results were: pulmonary signs much improved in two weeks, no râles remaining; expectoration was much reduced; appetite became normal;

diarrhœa vanished; weight increased rapidly; temperature was never above 99°. In addition to local antisepsis thus obtained, the stomach is not deranged by drugs and can tolerate more food.—*Le Nouveau Montpellier Medical*, No. 27, p. 27.

Treatment of Acute Broncho-pulmonary Affections.—Dr. E. Corgier calls attention to the value of creosote carbonate, which possesses all the advantages with none of the disadvantages of creosote. Naturally, it is more effective in recent and mild infections. In simple instances of bronchitis with fever, acute pulmonary congestion, pneumonia, or broncho-pneumonia of moderate intensity, especially when the remedy is administered at the onset of the disease, the fall of temperature is rapid, without secondary rise; the auscultatory signs disappear and the general condition improves. In more severe disease—pneumonias or broncho-pneumonias of more intense infection—the effects of the drug are marked. The fall of temperature is rapid, possibly followed by a temporary rise upon later doses. This fall is more sudden in lobular than in lobar pneumonias. It goes without saying that in advanced forms, as gray hepatization, the antiseptic effects may be wanting. After all physical signs have disappeared it is well to continue the remedy for several days. The expectorants, as kermes mineral, or ipecacuanha and the antipyretics, and especially enemas, are discarded. Counter-irritations in the form of baths or wet packs are possibly allowable. Heart stimulants are used if indicated, but cardiac weakness does not forbid the use of the remedy, but rather the contrary. The remedy does not disturb the alimentary tract. In shortening the disease and preventing relapses the dangers of consecutive infection of kidneys and heart, tuberculosis, and gangrene are lessened.—*Inaugural Thesis*, 1899 (Montpellier).

[The extension of the use of this remedy to conditions other than tuberculous, and its use in the treatment of acute infections of the respiratory tract, is worthy of attention. Considerable personal observation emphasizes the plea of the author.—R. W. W.]

The Treatment of Pneumonia.—Dr. H. A. Hare believes that abortive treatment is indicated in sthenic patients only, and recommends a hot foot-bath, hot or cold compress on the chest, depending on the temperature, tincture of veratrum viride, in 3 minims, three doses, being given at fifteen-minute intervals, and sufficient Dover's powder to lessen painful cough and to increase diaphoresis. Such treatment is not indicated after the first twelve hours. Early venesection is condemned, as it weakens the patient against exhaustion occurring later, by depriving him of valuable blood. When consolidation has taken place, hyperpyrexia is prevented by cold sponging, with friction, an ice-bag over the heart and to the head. Antipyretic drugs are too depressant; they also decrease vascular tone and the activity of the blood-cells.

Circulatory stimulation, if really needed, is best obtained with digitalis. It often fails because of high fever; if this latter be reduced by hydrotherapy, digitalis is most efficient. Response to the drug is so slow that 10 or 20 minims of the tincture should be given hypodermatically; its effect is so lasting that twelve to twenty-four hours may elapse before repetition is necessary. By this method the shuttle-like pulse of overdoses of digitalis is avoidable. When there is a relaxed and gaseous pulse, tincture of belladonna in 5 or 10-minim doses every four or five hours is useful, especially if the skin be relaxed. Strychnine is indicated when the patient is rapidly sinking, by its action as an irritant to the nervous system. It is to be used freely during this period, and then stopped, for strychnine simply goads the system to increased endeavor and does not aid it simultaneously. For prolonged collapse or tendency thereto, wine of cocoa is valuable. In sudden collapse, strychnine and atropine combined are admirable. Brandy is useful in patients advanced in years. Nitroglycerin is indicated only where the pulse is of high tension; where venous engorgement is great, venesection is much to be preferred. Oxygen is recommended when respiration is difficult; it quiets the patient, largely by its mental effect.—*The Therapeutic Gazette*, 1899, No. 7, p. 445.

Gastro-intestinal Antisepsis.—DR. JAMES MILLS advises in gastro-enteric infections emptying the stomach and cleansing the bowels with laxatives and enemata. Approximately sterile food is recommended. Drugs for intestinal antisepsis must be non-absorbable and non-toxic, in such doses as will cause antisepsis; they must, therefore, be insoluble. Castor oil, bismuth salicylate, iodoform, calomel (which becomes mercuric chloride in the stomach), guaiacol carbonate, and naphtalin are recommended. Salol is valuable, becoming salicylic and carbolic acid under the action of the pancreatic juice. Betanaphtol is preferable, for it is non-toxic. Resorcin is useful. Benzonaphtol has no action on the gastric secretion, and is an excellent intestinal antiseptic, 60 grains daily, in divided doses. Digestion is undisturbed by this drug.—*The Medical Standard*, 1899, vol. xxii., p. 268.

Diphtheria and its Treatment.—DR. BONNEFIU sums up results, after an exhaustive study of statistics, as follows: Isolation of patients and systematic disinfection of wards every fortnight have caused great diminution in the frequency of this disease; this change occurred two years before the introduction of antidiphtheritic serum-therapy, and has been due to the above procedures.—*Journal de Mêdecine*, 1899, vol. xi., No. 25.

Puerperal Fever and Antistreptococcic Serum.—DR. D. ARTHUR, after using uterine bichloride douches, quinine and perchloride of iron by the mouth, the patient being almost moribund, on the eighth day after delivery injected 150 minims of antistreptococcus serum daily for three days. In nine days eight injections of serum were given, their administration being governed by the height of the temperature. When apyrexia had existed for five days another injection was given; antitoxin poisoning resulted, with a slight urticarial rash, diarrhœa, and rectal hemorrhage. Complete recovery ensued. It is recommended that a single injection be given daily until apyrexia is established.—*British Medical Journal*, 1899, No. 2010, p. 78.

Septicæmia and Antistreptococcus Serum: Rapid Recovery.—DR. J. M. BRUCE, from results with the serum in two instances, concludes: 1. Antistreptococcus serum may succeed when other measures have failed. 2. It may act with great rapidity, all the symptoms disappearing in two days. 3. Success may attend the use of one serum after another preparation has failed, and on this last point much stress is laid.—*The British Medical Journal*, 1899, No. 2010, p. 76.

The Treatment of Syphilis.—Dr. D. Tait bases the intravenous method on the fact that mercury has no effect on the organism until it enters the blood, the leucocytes being the exclusive vehicle and agent of absorption. Mercuric cyanide, 1 part in 100 or 200, and corrosive sublimate, 1 part in 500 or 1000, are generally used. The amount injected daily should be from 15 to 45 grains. The skin over the flexor surface of the elbow is cleaned and the arm is constricted by a rubber bandage. Any prominent vein is chosen, the hypodermatic needle being introduced obliquely; the bandage is loosened. If a medium-sized needle be used, blood enters the barrel and makes certain that the needle-point has penetrated a vein. The patient should feel only the skin puncture. If any of the solution passes into the cellular tissue round about intense pain results, and induration follows, lasting several weeks. Extravasation of blood is avoided by using a needle of not too large calibre. In adipose patients and in women, the veins cannot always be made sufficiently prominent to perform the puncture. No dressing is required [?]. Experiment has shown that no thrombus occurs in the punctured vein. Repetition of puncture in the same vein causes no local or general disturbance. Mercuric cyanide is preferred to corrosive sublimate, as it contains a higher percentage of mercury (80 per cent.). Thus exhibited, mercury appears in the urine in ten minutes, and continues to be present for only thirty-six hours. Blood examination, after small diluted doses, shows an increase of red corpuscles and hæmoglobin, with hyperleucocytosis; with large doses the condition is reversed, hyperleucocytosis immediately resulting. Thus mercurial anæmia may be rapidly controlled. The injection of calomel is to be avoided, for pain, nodules, and suppuration are frequent results, and the amount of mercury thus absorbed is uncertain. It is recommended that the intravenous injections be made daily at the elbow. This method is for exceptional use, when ordinary measures have failed, as in syphilitic glossitis and phagedenism, and where *rapid* mercurialization is required. Tertiary syphilis of the eye, tongue, and nervous system, and primarily malignant syphilis are amenable to this form of treatment. In differential diagnosis intravenous injections are invaluable for their rapidity and accuracy.—*The Journal of the American Medical Association*, 1899, vol. xxxii, p. 1361.

Protargol in Gonorrhœa.—Dr. W. L. Baum, following the method of Neisser, thus recommends the use of protargol: 1. Having determined that the urethritis is still confined to the penile portion of the urethra, instruments are not passed beyond the anterior urethra. 2. If there is posterior urethritis, often where prolonged anterior injections are used, it is unnecessary to inject the posterior urethra. 3. Injections to be given thrice daily, after urination. The fluid is to be retained five minutes in the urethra after the first two injections, thirty minutes after the third. If much secretion is present, six injections, each of five minutes' duration, may replace the latter. 4. After a few days the prolonged retention of injected fluid should be discontinued. The other two are replaced by an injection of a suspension of bismuth or iodoform, 2.5 per cent. each, or boric acid solution, 3 per cent., or zinc sulphate, one-quarter of 1 per cent. When gonococci can no longer be discovered the injections are stopped. It is best to begin with one-quarter of 1 per cent. protargol solution, which is gradually increased to 1 per cent. Chronic gonorrhœa is often much benefited by these mild solutions. The protargol solution is not precipitated by albumin, and penetrates deeply into the urethral tissues. Thus treated fifty patients responded very satisfactorily, there being few complications.—*Medicine*, 1899, No. 7, p. 555.

Myxœdema Treated with "Colloid" Material.—Dr. R. J. M. Buchanan reports a case treated with colloid material prepared from the thyroid gland according to Hutchinson's formula, each tablet being the equivalent of five grains of the fresh gland. Beginning with 5 grains the dose was gradually increased until 20 grains a day were taken within one month. Dosage was then reduced to 10 grains, and after four months to 5 grains a day. There were no symptoms of thyroidism. Result was a rapid return to health. Complete alopecia was followed by a growth of thick, brown hair. Pulse and temperature became normal. Perspiration returned and the mental inactivity disappeared. Body-weight diminished. Drowsiness vanished, and appetite increased. The patient continued to take 5-grain doses daily, and remains in excellent health. With the loss in weight there was an increase in urea excretion at first, and then, though the weight continued to decrease, the urea diminished in quantity, and at this time the maximum dose of "colloid" was being administered.—*The British Medical Journal*, 1899, No. 2007, p. 1460.

Septicæmia Treated with Normal Salt Solution.—Dr. C. E. Edson states that the patient was subject to follicular tonsillitis, which, in the present instance, was replaced by the typical sore-throat of streptococcus infection. Constitutional symptoms followed, with aggravation of pain in the joints. Salicylates, alkalies, and anodynes were ineffectual. After a fortnight, the conditions all gradually growing more grave, sixteen ounces of hot sterilized salt solution were injected into loose tissues about the breast. Increase in urine was noticeable. Next day twenty-six ounces were injected into the median cephalic vein, and later eighteen ounces were injected under the pectoral muscle. A last injection of fourteen ounces was given two days later. Convalescence slowly appeared, and recovery was complete. Attention is directed to the great relief of pain following the injections. This, and improvement in nervous symptoms, resulted after each injection. Later the intense pain and restlessness would recur. Until the first administration of saline solution the patient was rapidly failing. Free diuresis and diaphoresis occurred after each injection. Apparently as beneficial results followed hypodermoclysis as venous infusion.—*Boston Medical and Surgical Journal*, 1899, vol. cxli., p. 83.

Diet in Typhoid Fever.—Dr. R. W. Marsden recommends milk only at first. When the infection is mild on successive days bread and milk, with custard, fish with mashed potato, chicken, bread and butter, and, finally, minced meat are allowed, nothing further until convalescence is well established. Patients gravely ill should be given only peptonized milk with meat-juice until well into the period of convalescence. Slight exacerbations of temperature and occasional irregularities of the bowels are not indications for the withdrawal of food. The patient's own wish is an important guide. The typhoid state being passed, and the tongue being moist, food is indicated when asked for. The various injurious consequences of a too early administration of solid food have been stated as (1) Diarrhœa. Etiology being considered, it is probably proportionate to the severity of the attack ; it has not a necessary relation to the extent of the intestinal lesions ; it is worse when the colon is ulcerated ; it is due to the associated catarrh. The last factor is the only one capable of influence by feeding ; the occurrence of vomiting, unusual abdominal fulness or uneasiness, and increased action of the bowels are supposed to result. In two hundred patients fed according to the above plan there was total absence of vomiting and abdominal discomfort. In only three patients diarrhœa increased, but it apparently was not due to feeding. (2) Hemorrhage. It is more common in the severe infections, being due to the separation of the sloughs or to the presence of funigating sloughs, or to the associated hyperæmia. In the same series of cases 3 per cent. of hemorrhage is reported, none being fatal. Most copious hemorrhages are met with chiefly in the worst attacks with much diarrhœa, and in such instances an advance to solid food has not been made. (3) Perforation. In the writer's series it did not occur, yet this complication is supposedly most prevalent as a result of the use of solid food. The only connection is through the mechanical irritation of ulcers. (4) Pyrexia. It is well recognized that very great variations in temperature may occur in patients who are kept on a milk diet. An exacerbation at the time of giving solid food is most often a coincidence, unless the change has been made too suddenly. If the exacerbation is temporary and unaccompanied by other symptoms, starvation diet is not justifiable. (5) Relapses occur. After irregular intervals and if it cannot be ascribed to the giving of solid food, a relapse is due to a reinfection of the blood, for intestinal lesions are found far advanced out of proportion to the obvious clinical relapse. Therefore, there is less chance of its being due to solid food when the relapse immediately follows than where a fortnight has intervened after taking solid food. To recommend the above alteration in the typhoid dietary are more rapid recovery, diminished risk of surreptitious feeding, lessened tendency to bolt food when allowed, without mastication, and diminished tendency to asthenic complications, such as post-typical anæmia, gangrene, etc.—*The Lancet*, 1900, vol. i. p. 90.

Ichthalbin.—DR. SAMUEL WOLFE finds that this substance, which is ichthyol albuminate, clings closely to mucous membranes, and thus gives a prolonged application. In diphtheria seven to fifteen grains have been blown into the throat at intervals of three to four hours with excellent results. In order to obtain a further action upon the gastric and intestinal mucous membrane, tablets, each containing five grains, may be employed, of which four to ten may be taken daily. The following conclusions are presented : 1. Ichthalbin is non-toxic and non-irritant to the stomach, admitting, on this account, practically unlimited dosage. 2. It is an intestinal antiseptic, a stomachic, and an aid to constructive metabolism. 3. It has no odor and almost no taste, properties which make it easy of administration without combination or disguise. Whenever ichthyol is indicated for local use, but when a dry, odorless powder is more easily applicable or otherwise preferable, ichthalbin should be used. Internally, the latter is preferable because it will not cause irritation, will not nauseate, is more pleasant to the taste, and can be administered in more efficient doses. In phthisis, secondary and tertiary syphilis, chronic rheumatism, and septic and pyæmic conditions, it is among the most available drugs. In all conditions of the mucous membranes where hyperæmia, increased and perverted secretion, or suppuration appears, it is decidedly efficient. In florid and inflammatory dermatoses it is among the best internal remedies.—*Merck's Archives*, 1900, No. 1, p. 9.

The Use of Ichthyol-vasogen in Diseases of the Joints.—DR. G. EDLEFSEN notes that inunction is important so that the medicament may penetrate to the deeper tissues. An instance of presumably tuberculous tarsus is cited in which complete relief of disability was obtained in a few weeks by the use of this substance (10 per cent.) twice daily. In monarticular rheumatism, particularly in recent disease, good results are obtained. Energetic massage is important. In the polyarticular variety there is marked lessening of the pain and increased mobility of the affected joints. Should the rubbing increase pain the older methods of painting on the alcohol-ether-ichthyol solution may be resorted to. Internal use of ichthyol in pill or capsule is advantageous. For this method the claim of a real addition to our therapeutic resources is made.—*Therapeutische Monatshefte*, 1900, Heft 1, S. 19.

The Action Upon the Renal Function of Hypnotics Associated with Diuretics.—DOTT. T. PIROCCHI, having reviewed the literature, attempts to ascertain from laboratory investigation (1) if chloral increases the diuretic power of other substances reputed to be capable of promoting a greater secretion of urine; (2) if other narcotics, not studied from this point of view, can, united with diuretics, produce the same effect as chloral; (3) to establish what may be the mechanism of such action; and (4) how much of the diuretic effect of drugs known as diuretics is really due to them, and how much to the narcotics used with them in experimental work. The diuretics chosen were caffeine, potassium nitrate, sodium nitrate, diuretin and arbutin; the hypnotics were chloral and duboisine sulphate. The conclusions reached were that chloral constantly increased the diuretic action of caffeine and arbutin, sometimes, but not always, that of diuretin and potassium nitrate, but has no effect in conjunction with sodium nitrate. As to whether other narcotics increase the action of diuretics as does chloral the researches of Cervello and Lo Monaco prove this to be true for curare and paraldehyde, and these observations add duboisine sulphate to the lists. These prove that duboisine sulphate always increases the diuretic action of caffeine, sodium nitrate, diuretin, and arbutin, and sometimes that of potassium nitrate. The mode of action of the associated hypnotic and diuretic is explained by a new hypothesis which will be presented in a future study. To determine how much diuretic effect is obtained as diuretics, *per se*, and how much comes from the associated narcotic, the following statements are made: Caffeine, itself a weak and uncertain diuretic, is reinforced by narcotics. All of the diuretic effect attributed to sodium nitrate, potassium nitrate, and arbutin is due to the narcotic. A part of the diuretic effect of the diuretin is due to the narcotic; but, on the other hand, this remedy acts vigorously upon the renal secretion. So far as these experiments go there is practical advantage in the following associations: chloral and caffeine, chloral and arbutin, duboisine sulphate and diuretin, duboisine sulphate and sodium nitrate, duboisine sulphate and arbutin.—*Il Policlinico*, 1900, No. 1, p. 51.

Chloretone a Safe Hypnotic.—DR. W. M. DONALD discusses trichlortertiary butyl alcohol or chloretone. It is made by adding caustic potash to equal weights of chloroform and acetone. It occurs as white crystals, with the odor of camphor. Slightly soluble in water, it easily dissolves in alcohol and ether. The tablet form is best for internal administration. It is especially recommended as a hypnotic and local anæsthetic. There are no depressing after-effects, and it is safe to administer large doses. Ten to fifteen grains, repeated in two hours if necessary, is the usual dose. One hundred and twenty grains have been taken in a single day. Profound narcosis followed for forty-eight hours; then inco-ordination of muscles, with diarrhœa. Mild general anæsthesia (absence of response to pin-pricks) lasted several days.

Nearly a week elapsed before the patient ceased to show effects from the drug. The pulse remained slow. Respiration was deepened, but the rate remained normal, likewise the quality and rhythm. Toward the end of the long sleep temperature became subnormal from exhaustion. Sleep was continuous for nearly a week, except when the patient was roused for nourishment and baths. During these periods he became partially conscious, later referring to incidents occurring during these intermissions. Gastric irritability was due as much to fasting as to the drug.—*The Therapeutic Gazette*, 1900, vol. xvi., No. 1, p. 18.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Eclampsia followed by Toxæmia in a Succeeding Pregnancy, with the Death of the Ovum.—In the *Transactions of the Obstetrical Society of London*, 1899, vol. lxi. p. 151, GRIFFITH and EDEN report the following case:

The patient, a multipara, had eclampsia at the eighth month of her third pregnancy. Labor was induced by the introduction of the bougie, and the patient recovered. She became pregnant eighteen months afterward, and five weeks after the beginning of the pregnancy she had severe lumbar pains, swelling of the legs and face, a large amount of albumin in the urine, with the nervous phenomena of toxæmia. The uterus was immediately emptied by rapid dilatation and the removal of the ovum.

The detailed report of the examination of the specimens may be summarized as follows: The decidual cells showed myxomatous and fatty degeneration. The changes in this tissue were so widely distributed and so well marked as to suggest that this structure was first affected, and later the chorion. In the chorion the cells showed similar changes to those in the decidua, with a considerable deposit of fat in the villi, which could not be definitely proven to be pathological. It seemed probable that the ovum was engrafted upon an endometrium made unhealthy by the condition of the mother's excretory organs; that the decidua became affected by the same changes present in the endometrium, and that as a result a morbid condition of the fœtal membranes ensued, resulting in the death of the embryo.

Indentation of the Fœtal Head by the Sacro-promontory.—In the *Scottish Medical and Surgical Journal*, November, 1899, BARBOUR publishes a paper upon this subject. He reports three cases, the first a flat rhachitic pelvis, with a conjugate of three and a quarter inches. The head was transverse and the occiput to the left side of the pelvis. Version was performed, and upon examining the fœtal head a vertical furrow was found in front of the right ear. This was above the ear, in the temporal fossa, and at one end of the bitemporal diameter. As this is the shortest transverse diameter of the head, and as version was performed to bring this diameter in relation with the antero-posterior of the contracted brim, it is natural to expect evidence of compression at one extremity of this diameter. A vertical direction of the furrow is explained by the fact that the head passed the brim in the position of extension.

In the second case the child was delivered with axis-traction forceps through a contracted brim. The head was high above the pelvis, and the bladder was greatly elongated. The external conjugate was seven inches, and the internal antero-posterior diameter three and a half. The head presented in the usual manner, and after a long and tedious labor the head descended sufficiently far to make the use of forceps possible. The cranium was greatly elongated, and above the left orbit was an indentation, showing the pressure of the promontory of the sacrum.

In the third case the pelvis was flattened, and the promontory projected very markedly. The pelvic measurements were not kept in this case. Labor began as a brow presentation, with the occiput toward the right side. Extension continued, and the head thus passed through the pelvis, the vertex being greatly flattened, and the occipito-frontal diameter of the head being much increased. A horizontal groove was found above the right ear. This showed that the occiput had rotated posteriorly and that the back was to the right, thus bringing the right side of the fœtal head against the sacrum.

Rectal Carcinoma During Pregnancy, with the Induction of Labor.—MACVIE (*Scottish Medical and Surgical Journal*, November, 1899) reports the case of a multipara who had suffered much from constipation. At the sixth month of pregnancy, after taking a laxative, she was seized with pain and bearing-down, straining tenesmus. Upon examination the cause of her suffering was found to be an obstruction of the rectum through a malignant growth. When the bowels were emptied by lavage the pain ceased. After consultation it was determined to allow the pregnancy to go on and to perform Cæsarean section. Her sufferings, however, increased considerably, and it seemed impossible to keep the bowels free. It was then determined to induce labor very gradually by inserting a bougie into the uterus. This was done, and when labor came on chloroform was administered for three hours, the head gradually passing the malignant growth and being born in spontaneous labor. The patient made a good recovery from the labor, and six weeks afterward a recto-vaginal fistula developed, which relieved the occlusion of the intestine. The child died of enteritis shortly afterward.

The Early Diagnosis of Pregnancy.—At a recent meeting of the Obstetrical Society of Vienna, BRAUN (*Centralblatt für Gynäkologie*, 1899, No. 17) called attention to a sign of early pregnancy, which he had found of great use in making the diagnosis. As is usually the case, he laid stress upon the presence of cholesterin in the breast and in changes in the color of the genital canal. The sign which he had found especially important consisted in unilateral development of the uterus, whereby upon examination one-half of the womb is felt larger than the other, especially near the cornu, while a sulcus can be distinctly felt running lengthwise between the two portions.

In discussion, SCHAUTA mentioned cases in which the ovum had lodged in one cornu of the uterus, which simulated ectopic gestation. In these patients the tumor was considerable in size, and exactly the consistence in extra-uterine pregnancy.

The Conditions Favoring the Passage of Soluble Substances Between the Mother and the Fœtus.—In the *Lyon Médicale*, 1899, No. 6, GUINARD and HOCHWELKER give the results of experiments which they have conducted to determine the passage of soluble substances from mother to child. Their results agree largely with those of other observers, to the effect that soluble substances, such as diffuse coloring materials, poisons, and toxins injected into the fœtus can pass into the organism of the mother. The opposite is also true. There is, however, one condition which must be present, and that is that the fœtus must be living; otherwise there can be no transmission from one to the other.

Two Cases of Cæsarean Section with Transverse Incision of the Fundus.—In the *Centralblatt für Gynäkologie*, 1899, No. 12, CRYZEWICZ reports two Cæsarean operations with transverse incision of the fundus as follows:

The first case was that of a rhachitic dwarf, aged twenty-four years, upon whom Cæsarean section was performed at the beginning of labor. Hemorrhage was controlled by compression by the hands of an assistant, and a living child as easily extracted. The wound was closed with seven deep stitches which passed through the entire wall of the uterus. Sterilized silk was used. Iodoform gauze was passed through the uterus into the vagina as a drain. The patient made a good recovery, complicated by slightly foul lochia for a few days and by very slight suppuration in the abdominal wall.

Case second was also a rhachitic patient, who had been delivered by Cæsarean operation some time before. She was brought to the hospital in labor, and, fearing rupture of the uterus from labor pains, which were strong, the second Cæsarean operation was performed. On opening the abdomen, which was not done through the old scar, strong and wide adhesions between the uterus and the abdominal wall were found through the whole length of the first incision. When these were separated a white, glistening scar was seen in the uterus, and the anterior wall of the womb was found considerably thinned. Nothing was seen of the sutures employed in the former operation. The second operation proceeded readily, and the placenta was found upon the anterior wall underneath the old scar, and the finger could be passed between the scar and the placenta. It was possible after removing the placenta to closely inspect the scar, when it was found that the only superficial and sub-peritoneal portion of the uterine wall had united. The womb was closed with buried silk sutures, and the patient made a good recovery.

Pyelonephritis Complicating Pregnancy.—VINAY and CADE (*L'Obstétrique*, 1899, No. 3) describe cases of this condition which they have investigated in a number of patients. They found that during pregnancy there exists a form of pyelonephritis characterized by sudden onset with intense general symptoms. Patients complain of acute pain in the lumbar region, and discharge pus abundantly through the urine. The right kidney is usually affected. It is comparatively easy to distinguish between this malady and cystitis, with which it was for some time confused. It usually attacks the patients at about the fifth month of pregnancy.

As regards the causation, two great factors are present: One, the compression of the ureters by the pregnant womb, and the other infection. This infection sometimes has its origin in the intestine, and finally communicates itself to the kidneys through the medium of the blood.

Brow Presentations.—In the *Centralblatt für Gynäkologie*, 1899, No. 41, SCHATZ gives the results of his experience in these presentations.

He believes that an essential element in causing brow presentation is spasm or stricture of the lower uterine segment. The exact cause of this is difficult to find, as it does not seem to depend upon any condition in the pelvis nor upon the shape of the child's head. In cases where the head is relatively small this cause can bring about a brow presentation. In some instances a rheumatic history is given by the mother.

As regards the treatment of the condition, if the os is partly dilated and the birth cannot proceed, it is well to try to relax the constricted tissue by the external application of warmth, by hot baths, hot packs, or the use of morphia. When delivery must be brougth about he is in the habit of applying the forceps to the sides of the head and converting the presentation into a face, rotating the chin anteriorly as the head descends upon the pelvic floor. If the head is freely movable above the pelvic brim, version is indicated.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Cystic Perithelioma of the Ovary.—MIRABEAU (*Monatsschrift für Geb. u. Gyn.*, Band x., Heft 4) infers from a study of his own and recorded cases that perithelioma is a dermoid growth springing from the adventitia of the smaller arteries, identical with so-called endothelioma of the perivascular lymph-spaces and of the lymphvessels and bloodvessels. All these neoplasms are derived from the mesoblast and are to be sharply distinguished from angiosarcoma. Endothelioma and perithelioma present two distinct types, the cystic-papillary and solid tubular; these may be combined with dermoids. With regard to the clinical history of perithelioma, the writer deduces from an analysis of the twenty-five reported cases that 84 per cent. were found in women over fifty years of age, although two of the patients were under ten and five between ten and twenty years. Nearly one-half of the patients were virgins or nulliparæ. No characteristic symptoms were noted. Ascites was noted in a few cases, but œdema of the abdominal wall or lower limbs was not observed. In some of the most marked cases only one ovary was affected. The malignancy of the growth is unquestionable; in fact, 40 per cent. of the patients died soon after operation. Twelve made a good recovery, and one was reported well four years after removal of the tumor. As in the case of all malignant growths, the prognosis depends upon the stage at which operation is performed and its thoroughness.

Drainage and Peritonitis.—SIPPEL (*Ibid.*), after repeating the usual statements with regard to the absorptive power of the peritoneum, emphasizes the importance of saline irrigation as a means of diluting toxins and removing secretions which serve as culture-media for bacteria, drainage serving to supplement this agent. Irrigation acts in no sense as a disinfectant, but certainly retards infective processes by diminishing the number of germs and thus lowering their activity.

The writer still uses glass drainage-tubes, principally to prevent compression of the gauze by the edges of the abdominal wound, which hinders the free escape of fluid by capillary action.

Stypticin in Uterine Hemorrhage.—FALK (*Ibid.*) infers as the results of experiments on animals that the hæmostatic action of this drug is not due to its action on the uterine muscle, so that it may be safely administered to pregnant women. Contrary to hydrochlorate of hydrastinin, it does not cause contraction of the vessels, but slowing of the blood-current, in which respect its action resembles that of opium. In short, it is a narcotic rather than a styptic, as shown by its sedative effect when administered to animals.

This opinion is borne out clinically by the fact that the most satisfactory results from the use of stypticin are obtained in cases of menorrhagia in anæmic girls and in women at the climacteric, in which the hemorrhage is not directly due to a local condition, such as fibromyoma or marked endometritis. Some cases of menorrhagia accompanying diseased tubes and ovaries were relieved by the drug, while in others which appeared to be identical in character the results were negative.

The writer agrees with Freund that stypticin is not a specific. He has never observed permanent relief from its use, while the local cause of the hemorrhage remained. In this respect it is of far less value than hydrastinin. Both drugs act more promptly and surely when administered hypodermatically.

Supravaginal Amputation of the Uterus in Disease of the Adnexa.—Fritsch (*Ibid.*), after trying the usual methods of dealing with suppurative disease of the adnexa, arrives at the conclusion that they are all more or less unsatisfactory. Incision and drainage do not effect a radical cure. Vaginal extirpation of the uterus is often followed by persistent pains due to intestinal and omental adhesions, or by shortening of the vagina and interference with coitus. He now adopts the same plan as in the removal of uterine fibromyoma—viz., the uterus is first amputated and adhesions and pus-sacs are dealt with afterward, drainage being dispensed with.

Atmocausis and Zestocausis.—Pincus (*Ibid.*) admits that intra-uterine cauterization is not free from danger, and requires special skill. The best results are obtained when the patient is not anæsthetized. Careful diagnosis in each case and thorough dilatation and protection of the cervix are important. It is possible to regulate the degree of cauterization, whether superficial or deep, by the temperature of the steam and the duration of the period of application. The rule should be to use the highest possible temperature with the shortest possible application. If it is repeated it is better to wait four weeks until the endometrium has been entirely renewed.

From an analysis of 833 observations the writer states that atmocausis is a specific in uterine hemorrhages from any cause, and is especially valuable in all forms of endometritis. When it fails it is in cases in which the uterus has lost its contractile power.

Steam is the best palliative agent in inoperable carcinoma, and may be used with advantage to disinfect the uterine cavity previous to total extirpation; also in puerperal septic endometritis when the infection is confined to the uterus.

It is absolutely important to exclude disease of the adnexa before beginning the treatment. The advisability of using atmocausis in acute gonorrhœa and in other acute inflammatory conditions of the uterus is still sub-judice.

Treatment of Intraligamentary Tumors.—Petroff (*Wratch; Annales de Gyn. et d'Obstétrique*, 1899, No. 10) calls attention to the fact that the usual method of dealing with bleeding surfaces between the broad ligaments after the enucleation of tumors is unsatisfactory. When the sac is sutured to the abdominal wound and is drained, recovery is often protracted, while Lebedeff's plan of ligating it in sections is not always feasible, since one of the peritoneal folds may be so thin that it is removed with the neoplasm. Moreover, adhesions are apt to form between the stump and the intestines or appendix.

He suggests the following method, which he has practised successfully: After incising the broad ligament transversely and enucleating the tumor, the anterior flap of peritoneum was preserved, while the posterior was removed with the growth, leaving an extensive bleeding surface. The posterior fornix is then incised (the finger being introduced into the vagina as a guide), and the peritoneal flap is drawn through into the vagina, completely covering the raw surface, which thus becomes extraperitoneal. The vaginal incision is then closed. In case suppuration should occur the pus is shut off from the peritoneal cavity and can be easily evacuated per vaginam.

Relation Between Menstruation and Pulmonary Tuberculosis.—NEUMANN (*Berliner klin. Wochenschrift*, 1899, No. 21) has established the following facts with regard to this relationship: 1. In many tubercular patients the temperature-curve is always higher during menstruation. Such an elevation in a patient with no pulmonary symptoms should always awaken suspicion, especially if she feels quite well during the intermenstrual period. 2. In patients with marked pulmonary disease the local signs may become aggravated during menstruation, without increased fever. If this phenomena is noted every month the prognosis is correspondingly grave. Such exacerbations are sometimes noted in cases in which the healing process is advancing rapidly, as shown by the reappearance of râles during menstruation. 3. In suspected cases, in which no physical signs of pulmonary disease have been previously discovered, latent foci may be detected during the menstrual period. The so-called nervous or reflex cough, often present in this class of cases, is really an evidence of the development of the tubercular process. A few days later the râles may have disappeared and no evidence of trouble can be found. 4. In other cases menstruation seems to exert a favorable influence upon the disease, dyspnœa being greatly relieved.

The practical inference from these observations is that during and immediately after the menstrual period women should be guarded against influences tending to develop a latent tendency to tuberculosis or to aggravate existing disease. Absolute rest should be maintained at this time, even when there is no elevation of temperature. Tubercular patients should not travel during menstruation.

Intestinal Obstruction due to Uterine Fibroids.—GOULLIOUD (*Annales de Gynécologie et d'Obstétrique*, 1899, Nos. 8 and 9) reports two cases of death from intestinal obstruction following supravaginal amputation of the uterus for fibromyomata that had developed beneath the peritoneum, displacing and obliterating the mesocolon. Although the gut was not occluded while the tumors remained *in situ*, the changed relations resulting from suture of the peritoneal flaps caused an angle in the sigmoid flexure which prevented the passage of feces and led directly to the death of the patient.

The Corpus Luteum.—CORNIL (*Annales de Gynécologie et d'Obstétrique*, 1899, No. 10) has devoted considerable time to a review of this familiar subject. He believes that each of the so-called corpora albicantia represents not a true cicatrix, but a complete destruction of a former corpus luteum which preserves its form and traces of its constituent parts in the ends of the ovarian stroma.

The corpus luteum of pregnancy is not peculiar to that condition, but is found in pathological conditions, either general or local, which are attended with ovarian congestion, as in typhoid fever. In the bodies of women who have died from cardiac disease the ovaries are often found to contain large corpora lutea or to be the seat of follicular hemorrhages.

The writer states that in several instances he has found these bodies in the ovary, especially in connection with uterine fibroids, which could not be distinguished from the corpora lutea of pregnancy.

In cystic ovaries the dropsical follicles invariably contain ripe ova, so that it seems fair to infer that rupture fails to take place at each menstrual period. Such ovaries may contain several corpora lutea of different ages, corresponding to separate periods.

Non-puerperal Purulent Metritis.—PETROW (*Wratch*, 1899, No. 28) reports the case of a nullipara, aged forty-one years, who was suddenly seized with pain in the right side of the abdomen, followed by symptoms of pyæmia, icterus, enlargement of the spleen, and metastatic pneumonia. The patient died eleven days later, and at the autopsy the initial focus of infection was found in the cervix uteri, which contained multiple abscesses. Phlebitis and lymphangitis of the uterine vessels and pus-foci in the left ovary, tube, and pancreatic tissue were also present. Pure cultures were obtained from the pus containing micro-organisms which were either the pyobacterium of Fisher or the bacillus coli commune.

The Surgical Treatment of Uterine Fibroids.—SCHANTA (*Ibid.*), in concluding an article on this subject, summarizes as follows: 1. Surgical interference is indicated only in the case of tumors which give rise to symptoms that cannot be relieved by any other treatment. 2. Vaginal extirpation is the safest and most satisfactory operation, and gives the best ultimate results; it is indicated in all cases of multiple fibromyoma in which the mass does not extend beyond the umbilicus and can easily be drawn down into the pelvis. 3. The abdominal operation is indicated in the case of large tumors with slight mobility, especially the intraligamentary variety. 4. Although supravaginal amputation, with intraperitoneal treatment of the stump, may give better immediate results than total extirpation, the latter is destined to become the preferable method because of the better ultimate results. 5. Supravaginal amputation with extraperitoneal treatment of the stump is useful, especially in cases in which rapid operation is necessary. 6. Vaginal enucleation of sessile intra-uterine growths, or the removal of subperitoneal fibroids by anterior or posterior colpotomy, as well as abdominal myomyotomy, should be reserved for special cases, since the tumors are usually multiple, so that a radical cure does not result; moreover, the danger is no less than in complete extirpation. 7. Curettement of the fibroid uterus is an uncertain therapeutic measure, not devoid of risk, and should be limited to those rare cases in which the tumor is in the early stage of development.

8. Castration will ultimately be abandoned, although it may occasionally be performed in cases in which it is impossible to perform a radical operation. 9. The use of clamps is justified in cases in which rapid work is necessary, but these offer no advantages over ligatures. 10. Drainage is of great value after both vaginal and abdominal extirpation, if there is extensive oozing, since it both promotes aseptic convalescence and prevents the formation of exudates. 11. The question as to the propriety of saving the ovaries is still *subjudice.* Prolapse may occur if they remain. Prolapse of the vagina may follow the operation whether they are removed or not.

Injuries During Coitus.—NEUGEBAUER (*Monatsschrift für Geb. u. Gyn.*, Band ix.) has made a careful study of this subject, based on seven personal observations and one hundred and fifty cases collected from the literature. Twenty-two resulted fatally.

The writer believes that these accidents are more common than is ordinarily supposed, and deserve careful study from a medico-legal stand-point. The most common lesions are perforation of the cul-de-sac (thirty-eight cases), longitudinal tears of the posterior vaginal wall (twenty-two), and laceration of the vulva (fifteen). In many cases there is merely an extensive rupture of the hymen, followed by profuse hemorrhage. Recto-vaginal and vesico-vaginal fistulæ have resulted from brutal attempts at coitus. In fatal cases death is usually due to infection, resulting in parametritis and perimetritis, though in a few instances patients have succumbed to hemorrhage.

Radical Operation for Prolapsus Uteri.—GOTTSCHALK (*Ibid.*) describes an operation which he performed successfully in a case of prolapsus of twenty-one years' standing in a woman sixty-three years of age. After total abdominal extirpation of the uterus the anterior peritoneal flap was sutured as high up as possible to the posterior wall of the pelvis. The stumps of the round, broad, and sacro-uterine ligaments were then united in order to support the bladder and strengthen the vagina, the latter being contracted by performing anterior and posterior colporrhaphy.

DERMATOLOGY.

UNDER THE CHARGE OF

LOUIS A. DUHRING, M.D.,
PROFESSOR OF DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA,

AND

MILTON B. HARTZELL, M.D.,
INSTRUCTOR IN DERMATOLOGY IN THE UNIVERSITY OF PENNSYLVANIA.

Lichen Scrofulosorum in the Negro.—T. C. GILCHRIST (*Johns Hopkins Hospital Bulletin,* May, 1899, No. 98) records a case in which there were about sixty groups of the characteristic papular lesions scattered over the body.

The patient, a healthy girl, showed no traces of tuberculosis, and in the examined sections of the skin no tubercle bacilli could be found, doubt thus being cast upon the tuberculous nature of these lesions.

Tuberculosis Cutis Propria.—E. BLOCH (*Dermatologisches Centralblatt*, January, 1899) thinks a sharp distinction should be made between primary tubercular ulcerations of the skin and other forms of tubercular disease, as lupus vulgaris, scrofuloderma, and the like. The first are rare, the latter common. The reporter records a rare case of tubercular ulceration of the vulva, accompanied with advanced tuberculosis of both lungs and of the intestines. The cutaneous ulcers were extensive, irregular, and superficial, with pale, smooth floors and light grayish nodules. Similar lesions also existed in the neighborhood of the arms. Tubercle bacilli could not be found in the discharge from the ulcers.

Pharmaceutical Notes.—HERBERT SKINNER (*British Journal of Dermatology*, June, 1899) speaks first of the *petroleum preparations* as bases for ointments, calling attention to their greasy and non-drying properties. He thinks that the absorption of the base in ointments is not everything, seeing that mercury ointment, when made with a mixture of soft and hard paraffin, is absorbed more readily than with any other base. The preparations of petroleum are the best fatty lubricators we possess.

The reporter gives the following formula for an excellent *cold cream ointment:* Benzoated lard, ℥iv; white wax, ʒiv; spermaceti, ʒj; borax, ʒss; glycerin, ʒj; cologne water, ℥ijss.

In prescribing *resorcin* care should be taken to avoid a combination with salicylic acid, as the two are incompatible; it is seen especially in a collodion menstruum, less in a fatty one. Resorcin oxidizes rapidly, this being particularly noticeable in ammoniated mercury ointment, the white turning blue-black in a few days.

The following lotion is very simple and often successful in allaying the itching and burning sensations in *urticaria:* Liquor hamamelidis, ℥ij; sal maris, ℥ss; aq., oj.

The following *iodine* preparation will recommend itself by the removal of the staining objection: Iodum resublimatum, gr. xxiv; acidum oleicum, ad. ℥j, It is absorbed much more readily than the others, is very clean in its application, is very soluble, and can be used stronger if needed.

Symmetrical Areas of Solid Œdema Occurring in Graves' Disease.—HOWARD MORROW (*British Journal of Dermatology*, July, 1899) reports a case occurring in a spare, married woman, aged forty-five years. On the front and outer aspect of both legs were symmetrical raised areas of swelling, beginning two inches above the ankles and extending upward seven inches, each area being about three inches wide. The œdema was more marked on the lower than on the upper part; was dense to the trunk, and did not easily pit on pressure; was not tender or painful, and had remained stationary in extent for several months. Under massage during one month the areas became softer. The chief point of interest in the case is the symmetry.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

J. SOLIS-COHEN, M.D.,
OF PHILADELPHIA.

Primary Hemorrhage Following Amygdalotomy.—An instance of this infrequent occurrence was cited by DR. G. B. HOPE (*New York Medical Journal,* March 3, 1900). The patient was a muscular, married woman, twenty-six years of age, whose tonsils were excised, under chloroform anæsthesia, during an attack of bilateral amygdalitis. The bleeding for the first few moments was extremely brisk, and continued during more than three hours as a free hemorrhage, though occasionally abating slightly. The ordinary hæmostatics were altogether ineffective, and it was only with the persistent employment of the electric cautery that an arrest of the hemorrhage was secured, and while the patient was rapidly becoming exsanguinated.

As suggested by the writer of the paper, it is probable that physiological exhaustion played its own part in arresting the hemorrhage. The hemorrhage was seen to have arisen from an arterial branch on the right side near the anterior portion of the cut surface.

Fibrolipoma of the Tonsil.—This rare neoplasm, reported by DR. THOMAS AMORY DE BLOIS, of Boston (*New York Medical Journal,* October 28, 1899), was the size of a small peanut and hung by rather a thin pedicle, which appeared to grow from a crypt in the left tonsil near the top. It was readily cut off with the incandescent snare. "Microscopical examination shows a section bounded completely, except for one-sixth of its periphery (the pedicle), by dermis. Within is a coarse, irregular network of fibrous tissue, the fibres of which are somewhat separated (œdematous), the network bearing, most deeply in the mass, areas of large fat globules."

[We are not aware of any similar incidents on record, although several such growths have been reported as occurring in other portions of the oropharyngeal cavity.]

Spirillum in False Membrane on the Tonsil.—DR. CHARLES F. CRAIG (*Medical News,* March 10, 1900) makes some observations on spirillum occurring in the false membrane of the tonsil. The case was that of a young man with difficulty in swallowing and soreness of the throat on the right side. He did not have headache, fever, or other constitutional symptoms. An enlarged, slightly reddened tonsil, covered with a thick, dirty white membrane, occupied the posterior portion and extended to the surrounding mucous membrane. It was easily removed and left a smooth and slightly reddened surface beneath. A portion of the membrane submitted to microscopic inspection showed it to be composed of degenerated epithelium, some cocci and bacilli, and an immense proportion of spirilla. These spirilla were large, from 20 to 35μ in length, but very narrow. They resembled much the spirilla of relapsing fever in their size and shape, and formed in some places large and entangled masses. The membrane was found to be composed almost entirely of epithelial débris and these bacteria.

Rare Ulceration of the Œsophagus in Typhoid Fever.—DR. DAVID RIESMAN reports (*Philadelphia Medical Journal*, September 23, 1899, illustrated) a case of typhoid fever with ulceration of the œsophagus and complicated with croupous pneumonia, in a young farm-hand, seventeen years of age, who had tramped from Baltimore to Philadelphia, where he was arrested as a vagrant and transferred to the Philadelphia Hospital, under the care of Dr. R. G. Curtin. There had been no symptoms during life indicating involvement of the œsophagus, and the discovery of the ulcers was made incidentally during the autopsy. A chain of four ulcers was found on the anterior wall of the œsophagus to the right of the middle line and extending perpendicularly downward to a point 2.5 cm. below the base of the pharynx. With the intervening tissue the four ulcers measured 23 mm. in length. Opposite the ulcers, on the left side, was a prominent gland of lymphoid follicles, and the lymphoid nodules all along the œsophagus were well-marked as small, whitish, non-ulcerated points. The lymphoid follicles on the anterior wall at the base of the pharynx were also prominent. The ventricles of the larynx presented a rough appearance, but were not ulcerated. The faucial and lingual tonsils were enlarged, as was also the middle lobe of the thyroid gland.

Anatomy of the Frontal Sinus and the Anterior Ethmoidal Cells.—DR. ARTHUR HARTMANN, of Berlin, has been studying this subject, and has made some interesting anatomical preparations to show (*Journal of Laryngology, Rhinology, and Otology*, February, 1900) the methods by which the frontal sinus is developed and the nasal frontal duct constructed. The latter is largely due to the conformation of the anterior ethmoidal cells, which Dr. Hartmann prefers to call frontal cells, and the many variations in the extensions of which give rise to various forms of the duct. He contends that in operating upon this region for obstruction it is not sufficient to remove the floor of the frontal sinus, but that the floor of the frontal cells must also be removed in order to obtain a free communication between the frontal sinus and the nose. For this reason he advises that an opening be made into the frontal sinus and another into the frontal cells through the inner wall of the orbit, and that the walls of the frontal cells be removed with forceps.

Spontaneous Retrocession of a Presumptive Malignant Growth of the Larynx.—Under the head of "Diagnostic Mistake," SIR FELIX SEMON, of London, reported to the Laryngological Society of that city (*Journal of Laryngology, Rhinology, and Otology*, February, 1900) a case of tumefaction of one side of the larynx, with fixation of the vocal band in the cadaveric position, and enlarged glands below the anterior portion of the sternocleido muscle, in which there was a somewhat indefinite history of a chancre many years before, apparently not followed by secondary symptoms, although it had not been submitted to treatment. Iodide of potassium in 10-grain doses was given for some three weeks, during which the tumefaction and glandular swellings increased; pain in swallowing had become worse and the voice very harsh. The disease was now deemed to be malignant—an opinion which was entertained by three other physicians also—and an attempt made to perform laryngectomy. Tracheotomy was performed, and a cut joining the tracheotomy incision was made parallel to the border of the lower jaw; but the presence of a number of glands, apparently infected, led to the determination to abandon further operation. To the naked eye the glands appeared epitheliomatous, but no microscopical examination was made. The patient recovered promptly from the operation and returned home a fortnight afterward. Eleven months later the patient reappeared looking very well and saying that he had been gaining flesh and strength. He stated that the glands in the neck had continued to enlarge for a month or two after the operation, but since then had gone down. His voice was still hoarse, but strong. He could breathe without the tube, and the difficulty in swallowing had entirely disappeared. He had been taking a preparation of Chian turpentine.

Rhinopharyngeal Vascular Growths.—The trouble often given by these growths and the success following measures often tedious and impracticable is well exemplified in two cases of large vascular tumors of the nose and pharynx by PROF. M. F. COOMES, of Louisville (Reprint from *Louisville Medical Monthly*). The growths were removed piecemeal; in the first case after a variety of procedures, both through the natural passages and by extensive external operation, having failed on account of profuse hemorrhage. The cold wire snare applied to accessible portions of the tumor from time to time, and left in position from eighty to one hundred and twenty hours before severance, formed a large factor in the treatment.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

W. T. COUNCILMAN, M.D.,
SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY,

AND

F. B. MALLORY, M.D.,
ASSISTANT PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY.

On the Origin of Simple Cyst of the Ovary.—V. KAHLDEN (*Ziegler's Beiträge*, 1900, xxvii. 1) presents a very full and elaborate paper on the above subject. The general opinion at the present time in regard to simple cysts (hydrops folliculi) of the ovary is that they are retention cysts originating in the Graafian follicles. Pfannenstiel and Orth, however, think that some of them may be new growths. The theory of their origin from Graafian follicles originated with Rokitansky, who claimed to have found ova in cysts under the size of beans; in the larger cysts they could not be demonstrated.

His observations have been copied in all the text-books and special treatises without further verification. The ova he saw may have come from true Graafian follicles, or they may have been swollen, degenerated cells which resembled ova.

If the simple cysts are retention cysts it is difficult to say why retention occurs. The cysts are very superficial; the albuginea is not thickened; the walls of the cysts are very thin; in typical cases there is no evidence of old adhesions on the surface; true Graafian follicles rupture without trouble beside these cysts. Evidently the etiology is unsatisfactory.

Moved by these facts, v. Kahlden studied cystic ovaries from nineteen cases, varying in age from thirty to ninety-seven years. The ovaries were hardened *in toto*, and many sections made from each. His observations seem to show pretty conclusively that in many, perhaps all cases, these cysts do not arise from the Graafian follicles, but from the germinal epithelium which grows into the ovary in the form of fissures lined with epithelium or of solid masses of epithelial cells; these give rise to glands which develop into cysts. The process has a certain analogy with the embryonic process whereby the germinal epithelium grows in as Pflüger's tubes, to form the follicles.

This view of the origin of the cysts is based on the following reasons:

1. It is possible in a great many cases to demonstrate ingrowths of the germinal epithelium. According to v. Kahlden, in the larger proportion of cases but little gland tissue is formed from these ingrowths, and that develops quickly into cysts. In a smaller proportion of the cases the new formation of epithelium is abundant; it occurs at first in the form of numerous closely adjoined masses of epithelium, which occasionally may resemble carcinoma. Degeneration takes place in these cells, leading early to the formation of cysts.

2. Ova are not present in the cysts even when the cysts are so small that it would be impossible for the ova to have degenerated.

3. Very rarely one of these cysts attempts to produce ova. v. Kahlden reports such a case, similar to one reported by Neumann. In the wall of the cyst were over a thousand ova-like bodies; some of them were very typical in appearance, but they never reach the normal size.

4. The cysts are often present years after the functional activity of the ovary has ceased.

v. Kahlden adopts the term "simple serous cysts," already proposed by Pfannenstiel as the most suitable designation for these cysts, and discusses at considerable length their relation to the other cystic growths of the ovary, to which they must be regarded as related because intermediate forms occur.

[The paper is interesting and exhaustive, but has no summary at the end; is interminable in length, and hammers away at a single line of thought with endless repetition. Condensed into a quarter as much space or even less, and logically, concisely stated, without any wandering from the main subject, it would unquestionably be more widely read and make a stronger impression.—Ed.]

Elastic Tissue in Normal and Pathological Organs.—Melnikow-Raswedenkow (*Ziegler's Beiträge*, 1899, xxvi. 546) considers the organs successively, devoting a section under each to the normal and the pathological distribution and conditions of the elastic tissue. He does not consider the literature, but attacks the subject as one who is doing a pioneer work, giving a text-book account of the normal and pathological histology of elastic tissue. He has gone over a large amount of material which he enumerates in detail. At the end he gives a systematic summary of the distribution of elastic tissue in the organs, and finally considers the normal and pathological physiology of his subject.

He finds that Weigert's elastic tissue stain gives the best results, excelling even the orcein method.

The bloodvessels are earliest and best supplied with elastic tissue. The vascular system is the earliest to organize and functionate. The elastic tissue aids in the circulation and acts as a support for the muscle fibres. It has a mechanical function in the spleen also; but in the passive organs, such as the liver and pancreas, the amount is small. The bloodvessels and lymph-vessels serve as a source of elastic tissue in all parts of the body.

Elastic tissue appears in an organ before its active function begins. In the new-born the respiratory and circulatory systems are well supplied, but the other organs contain little. In old age, which is associated with physiological atrophy of the organism, it increases with the atrophy of the specific elements of the organs. He believes that here it is a mechanical contrivance to take the place of the decreasing energy of the active tissues and for protection against outside agencies. The arteries afford a good example of this. In the atrophy of parenchymatous organs it is compensatory.

Elastic tissue is very resistant to pathological processes and proliferates readily wherever it may subserve a useful purpose. It is destroyed by acute, especially the purulent, inflammations. It is increased in the vessels and in all the organs by chronic passive congestion. Simple or inflammatory atrophy increases it. He believes that the absence of elastic tissue in tumors partially explains the nutritional disturbances which lead to necrosis. In cirrhosis of the liver there is an increase in elastic tissue only when atrophy begins. In general, elastic tissue acts as a support to the specific elements of the organs.

A Case of Hæmochromatosis.—Opie (*Journal of Experimental Medicine*, 1899, iv. 279) reports a case which he considers as representative of an intermediate stage between the hæmochromatosis of von Recklinghausen and the bronzed diabetes of Hanot and others. His conclusions are:

1. That there exists a morbid entity, hæmochromatosis, characterized by a wide-spread deposition of an iron-containing pigment in certain cells, and an associated formation of iron-free pigment in a variety of localities in which pigment is found in moderate amount under physiological conditions.
2. With the pigment accumulation there is degeneration and death of the cells, and later an interstitial inflammation, especially of the liver and pancreas, which become the seat of inflammatory changes accompanied by hypertrophy of the organ.
3. When chronic interstitial pancreatitis has reached a certain grade of intensity, diabetes ensues, and is the terminal event in the disease.

The author's case was a man, aged fifty-five years, who came under observation during an attack of typhoid fever. A marked universal bronzing suggested Addison's disease. Jaundice was not present, and there was no sugar in the urine at any time during the period of observation.

At the autopsy, in addition to the lesions of typhoid fever, there was a marked general pigmentation of the liver, pancreas, heart, stomach, intestines, peritoneum, lymphatic glands, skin, and testicles. There were also cirrhosis of the liver and chronic interstitial pancreatitis.

Histologically this pigment is seen to be in the cells of the parenchyma of the glandular organs, the interstitial tissue, and the endothelial cells of the capillaries. It is in the form of yellowish-brown granules varying in size. These give the microchemical reactions characteristic of iron. There is also less conspicuous variety of pigment in the walls of the arteries. It is in the form of pale yellow granules of almost uniform size. They are in the smooth muscle and connective tissue cells. These granules do not give the microchemical tests of iron, but stain deeply with methylene blue. In the intestine this iron-free pigment predominates, and is chiefly in the vessel walls and the smooth muscle cells.

The important features of hæmochromatosis as described by v. Recklinghausen are:

1. The presence of an iron-containing pigment in the epithelial cells of various glands, especially the liver and pancreas.
2. The presence of an iron-free pigment in the smooth muscle cells of the gastro-intestinal tract and of the blood and lymphvessels, and in certain connective tissue cells.
3. The association of cirrhosis of the liver with the pigmentation.

The so-called "bronzed diabetes" of Hanot is characterized clinically by a rapidly fatal diabetes mellitus associated with cirrhosis of the liver, usually hypertrophic. Bronzing of the skin is not constant, though usually present. At autopsy there have been found deep pigmentation of the liver and pancreas, with cirrhosis, and, when carefully examined, interstitial pancreatitis. An iron-containing pigment is also present in the parenchyma of the liver, pancreas, and other glands, and in certain other parts. The majority of French observers have mentioned only the presence of the iron-containing pigment. Buss, however, reports a case of diabetes with cirrhosis of the liver, interstitial pancreatitis, and general hæmochromatosis. He finds the iron-containing and iron-free pigment in the situations described by v. Recklinghausen. In the author's case there were hæmochromatosis, bronzing of the skin, advanced cirrhosis of the liver, and interstitial pancreatitis, but no diabetes.

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are received only *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

Dr. Alfred Stengel, 1811 Spruce Street, Philadelphia, U. S. A.

Or

Dr. Hector Mackenzie, 59 Welbeck St., Cavendish Sq., London, W., Eng.

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES.

JUNE, 1900.

THE SURGICAL ANATOMY OF CONGENITAL DISLOCATION OF THE HIP-JOINT.

BY EDWARD H. NICHOLS, M.D.,
AND
EDWARD H. BRADFORD, M.D.,
OF BOSTON.

(*From the Sears Pathological Laboratory of the Harvard Medical School.*)

THE operation for the reduction of congenital dislocation of the hip-joint has been developed so far that often in young children the deformity can be corrected by forcible reduction without incision. In some of these cases, however, the reduction is not permanent, and relapses occur. In this paper the anatomical causes of the relapse are considered.

The following description of the anatomy of congenital dislocation of the hip-joint is based entirely upon the examination of five specimens of the deformity, which include eight hip-joints, which are preserved in the Warren Museum of the Harvard Medical School.

Brief reference is made to important points in the anatomy of the normal hip-joint; each pathological specimen is described in detail; conclusions about the general character of the deformity, as shown by these specimens, are drawn; and the anatomical obstacles to the reduction of the deformity are enumerated.

The pathological specimens are five in number. For convenience of reference they are mentioned as Specimens A, B, C, D, and E. Specimen A presents the bones, apparently of adult size, of a case of congenital dislocation of the left hip. The clinical history is not known. Specimen B is the pelvis and the upper half of both femurs from a case of double congenital dislocation of the hip in a young female adult. The clinical history is not known. Specimen C is an alcoholic preparation of a case of double congenital dislocation in a child of about ten years of age. The right hip is intact, the left hip was operated upon by the old Hoffa method, and the child died of diphtheria one month later. Specimen D is an alcoholic preparation of a right congenital dislocation in a child of four years, who died of scarlet fever without operation. This specimen is the least perfect one, but shows certain features well. Specimen E is an alcoholic preparation of a case of double congenital dislocation in a child of four years. The left hip was operated upon by open incision, and the child died seven months later of whooping-cough. The right hip is as left after forcible reduction.

Before describing the pathological specimens, brief reference is made, for the sake of comparison, to certain features of the anatomy of the normal hip which are of special importance in the deformed joints. The same order is maintained in the description of both normal and pathological specimens, namely: 1. Bones, (*a*) acetabulum, (*b*) femur (head, neck, shaft). 2. Capsule and ligaments. 3. Muscles.

THE NORMAL HIP-JOINT.[1] [2] *Bones.* The acetabulum is a hemispherical cup, directed downward, outward, and forward, bounded by an uneven rim which is thickest above. The centre of the acetabulum, the "fossa acetabuli," is filled with fat tissue which is covered by synovial membrane. The head of the femur is globular, rather more than a hemisphere, directed upward, inward, and forward, with the greater part of its convexity above and in front. Behind and a little below its centre is a depression for the insertion of the ligamentum teres. The *neck* of the femur joins the head to the shaft, and makes, with the shaft, an angle of 130°.[3] [4] Other observers[5] [6] claim that the average angle is some five degrees less. There is considerable individual variation, between 110° and 144°. There is also an inconstant variation with age, sex, and height. But no observer has found the angle of the normal neck with the shaft even to approximate an angle of 90°. The normal shaft shows no appreciable lateral curve, but it is slightly convex forward. The shaft is somewhat rotated on its vertical axis, so that if head and neck are projected upon the same horizontal plane, the long axis of the neck cuts the transverse axis of the condyles at an angle of 25°,[7] giving the so-called "angle of femoral torsion." Other observers make this angle of femoral torsion somewhat greater, but in no case has it been found greater than 37°.[8]

---

[1] Gray's Anatomy, American edition, 1896, p. 278.

[2] Quain's Anatomy, tenth edition.

[3] Gray's Anatomy, loc. cit.

[4] Kraus, cited in Bertaux.

[5] Bertaux. L'Humerus et le Femur, 1891, p. 117.

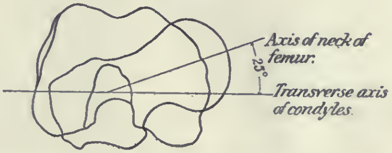
[6] Dwight. The Range and Significance of Variation in the Human Skeleton, 1894.

[7] Bertaux. Loc. cit.

[8] Mikulicz. Ueber individuelle Formdifferenzen am Femur und an der Tibia, p. 350. Arch. Anat. und Entwickelungsgesch, 1898.

Ligaments. The *cotyloid ligament* is a rim of fibrocartilage, which is attached to the margin of the acetabulum, the cavity of which it deepens. It forms practically a complete circle. The *capsular ligament* is attached above to the ilium, just outside the cotyloid ligament, surrounds the neck of the femur, and is inserted in front to the anterior intertrochanteric line, above to the base of the neck, behind to the neck of the bone, 1.2 cm. above the posterior intertrochanteric line. From this attachment fibres are reflected upward over the neck of the femur, "cervical reflection," as far as the articular cartilage of the head. The capsule is thinnest below. The iliofemoral or "Y" ligament is attached above to the lower part of the anterior inferior spine, and descends, diverging, so that the inner portion is inserted into the lower part, the outer portion into the upper part of the anterior intertrochanteric line. The *ligamentum teres* is a triangular ligament, attached to the edges of the cotyloid notch, and inserted into the depression behind and below the centre of the head of the femur.

FIG. 1.



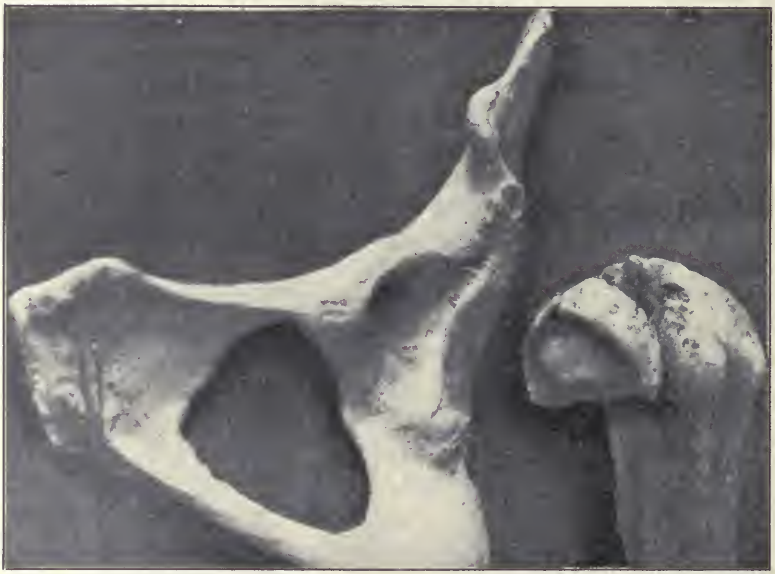
Modified from Bertaux. Shows the normal angle of femoral torsion, 25°.

Pathological Anatomy.

Specimen A is a dry preparation consisting of the greater part of the left innominate bone, of adult size, and includes the acetabulum and the upper fourth of the corresponding femur.

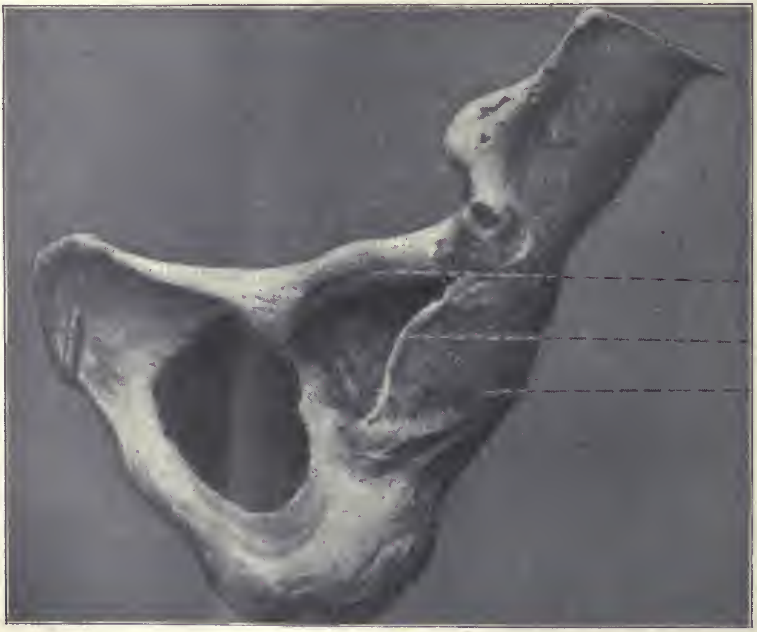
Acetabulum. The acetabulum is small, approximately triangular, with its base just above the obturator foramen, while the apex is directed upward, and slightly outward and backward when the pelvis is held in normal position. The surface of the acetabulum faces almost directly outward. The apex of the acetabulum is just below and slightly anterior to the anterior inferior spine. The base is 2.5 cm. wide at the widest point, and the cotyloid notch is 2 cm. wide. The greatest height of the acetabulum is 4.4 cm. The fossa acetabuli is relatively very large, and its base is fairly smooth and perforated by a few large foramina for vessels. There is evidence of but little normal articular cartilage, and this little extends along the sides of the upper portion of the acetabulum, and is most obvious at the apex. This articular surface is not over 0.5 cm. wide at the widest point. Just posterior to the posterior side of this distorted acetabulum, upon the surface of the ilium, is a smooth triangular surface, with its base toward the acetabulum, and its apex directed backward to a point about 0.4 cm. above the spine of the ischium. This smooth surface appears to represent the surface with which the dislocated head of the femur articulated. It appears as

FIG. 2.



Specimen A. Acetabulum and head of femur. Shows triangular acetabulum, with shallow cavity and overhanging posterior lip. Posterior articular facet. Triangular head, with wheel-like articular rim. Apex of great trochanter above head of femur.

FIG. 3.

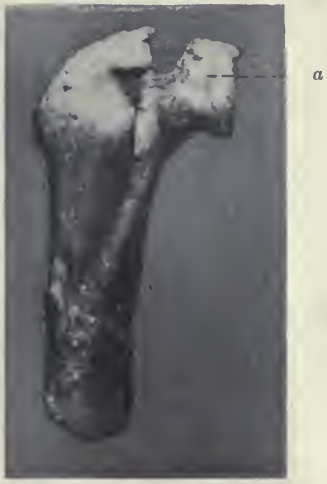


Specimen A. Face of acetabulum. Acetabulum triangular, faces outward, shallow. Slight overhanging of upper lip. Marked convexity and overhanging of posterior lip. Triangular articular facet behind acetabulum.

if the femur had pressed the posterior lip of the acetabulum in such a way that the lip is convex forward, and projects slightly over the base of the cavity. The acetabulum is shallow, only 1.8 cm. deep at the deepest point. The bony base of the acetabulum is thin, approximately 1 cm. Just above the apex of the acetabulum, behind and below the anterior inferior spine, is a prominence apparently for the attachment of the reflected head of the rectus muscle.

Femur. The *head* is flattened laterally, is convex above, and nearly straight below, so that it is converted into a semicircular disk, which lies nearly at right angles to the long axis of the neck. The superior convex surface of the disk is about 1 cm. wide, smooth, and apparently was covered with cartilage during life. It makes a semicircular, half-wheel-like rim, which apparently articulated with the triangular surface on the ilium already described. The lateral surfaces of this disk-shaped head are roughened, and show no evidence of articular cartilage.

FIG. 4.



Specimen A. Left femur seen from behind. Disk-shaped head, with wheel-like articular rim. Top of trochanter higher than head (*a*). Neck joins shaft at an angle of 95°.

The neck is very short, flattened vertically, and widened anteroposteriorly. It joins the shaft at an angle of 95°.

The "angle of torsion" is obviously increased, although since the condyles are lacking the amount of torsion cannot be measured accurately. An attempt was made to measure the angle approximately.

The average angle in twenty normal femurs[1] was found to be 89°, the angle of this specimen (A) was 155°, showing an increase of 66° in the angle of torsion.

---

[1] The linea aspera practically bisects the posterior surface of the femur. The angle made by the long axis of the neck of the femur with a plane passed from the middle of the anterior surface of the shaft of the femur to the linea aspera can be measured. The average angle made in this way was measured in twenty normal femurs taken at random from the collection in the Warren Museum. The average angle in these twenty cases was 89°, the smallest angle was 84°, the largest was 100°. The method is not as exact as the method usually used, but the results are approximate.

Ligaments and *muscles* are wanting in this specimen.

Specimen B is a specimen of double congenital dislocation of the hip in a female adult. The clinical history is unknown, as the specimen was obtained from the dissecting-room. The entire pelvis and rather more than the upper half of each femur have been preserved. Each hip is described separately.

RIGHT HIP. *Acetabulum.* The acetabulum is directed almost directly outward, with slight overhanging of upper lip, is triangular in shape, and has the base directed toward the obturator foramen. The apex of the triangle points upward and slightly outward and backward when the pelvis is in normal position. The apex of the triangle is about 0.8 cm. below and slightly posterior to the base of the anterior inferior spine of the ilium. The greatest width of the base is 2.8 cm., while the width of the cotyloid notch is 1.8 cm. The height of the acetabulum is 4.2 cm. The acetabulum is shallow, 1.2 cm. at the deepest point. The fossa acetabuli is relatively large, and occupies nearly the entire area of the acetabulum, and has a rough base perforated by numerous foramina for bloodvessels. The cartilaginous rim is very small, and appears only as a smooth, narrow rim along the entire posterior side of the triangle, extending over the apex and along the upper half of the upper side. The thickness of the bony base of the acetabulum is approximately 1 cm.

FIG. 5.

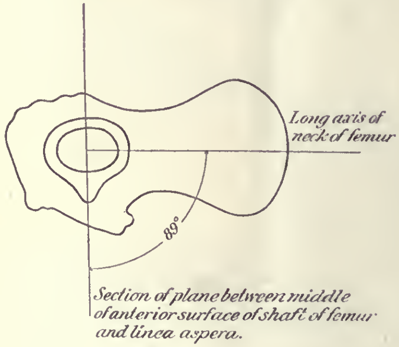

Long axis of neck of femur
89°
Section of plane between middle of anterior surface of shaft of femur and linea aspera.

FIG. 6.

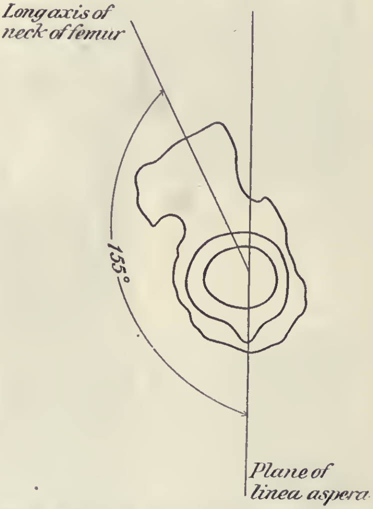


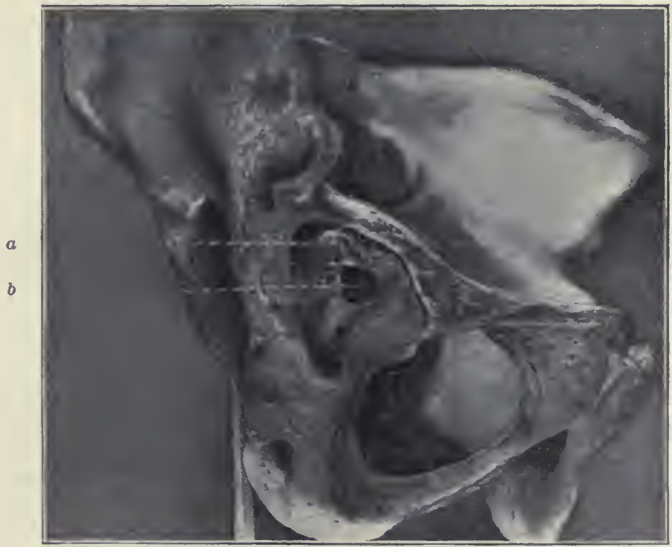
FIG. 5.—Plane middle of anterior surface of shaft of femur and linea aspera, and long axis of neck of femur are projected upon one surface. Angle is 89°.

FIG. 6.—Specimen A. Shows that angle between the plane of the linea aspera and the axis of the neck of the femur is 155°, an increase of 66° in the angle of femoral torsion.

Just above the posterior margin of the acetabulum the surface of the ilium is elevated into a roughened bony ridge, and above this ridge is a pear-shaped depression, probably for the attachment of the reflected head of the rectus muscle. There is no sign of any abnormal articular area upon the surface of the ilium.

Femur. The *head* of the femur is very irregular in shape, rather conical, convex above, flattened below and widened antero-posteriorly, so that the outline of the surface is somewhat irregular. Somewhat below the tip of this triangular head is an ovoid depression, as if for the insertion of a ligamentum teres. Below this depression the surface of the head is roughened, and apparently was not covered with cartilage during life. The head is slightly below the level of the top of the great trochanter.

FIG. 7.



Specimen B. Right acetabulum. Shows triangular, shallow acetabulum (*a*), large fossa acetabuli (*b*), and narrow cartilaginous rim.

The *neck* of the femur is short, triangular on cross-section, and makes an angle of 95° with the shaft. The long angle of the neck makes an angle of 118° with a plane passed between the middle of the anterior surface of the shaft of the femur and the linea aspera. This is 29° greater than the corresponding angle in the twenty normal femurs, and shows that the angle of torsion is 29° greater in this specimen than in the normal femur.

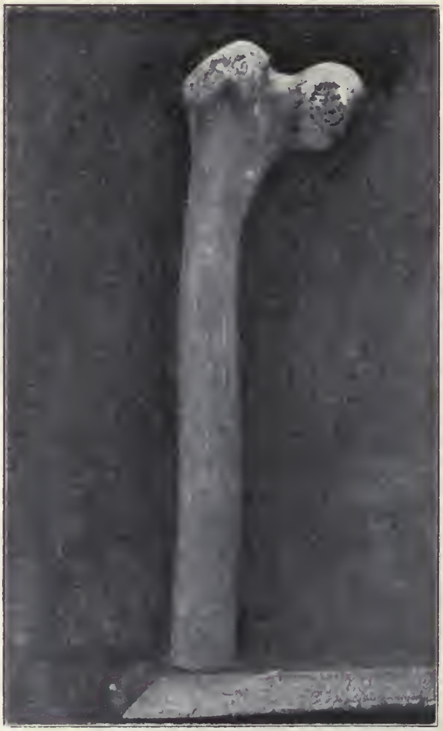
The *shaft*, beginning about 2.5 cm. below the tip of the great trochanter, shows a marked lateral curve, convex outward, extending over a length of 7 cm. Below that point the shaft extends directly downward.

Ligaments and *muscles* are wanting.

Left hip. The left hip presents the same general features, but differs somewhat in details.

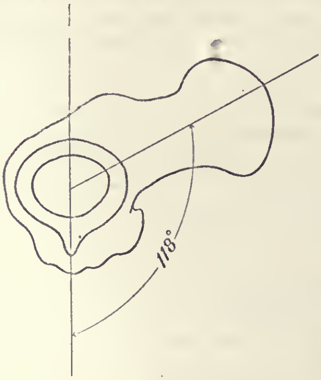
Acetabulum. The acetabulum is triangular, and occupies the same relative position as the right acetabulum. It is 3 cm. wide at the base,

FIG. 8.



Specimen B. Right femur, front. Irregular head, lower than the great trochanter, short neck, which joins shaft at an angle of 95°.

FIG. 9.



Specimen B. Right femur. Angle of femoral torsion is 118°.

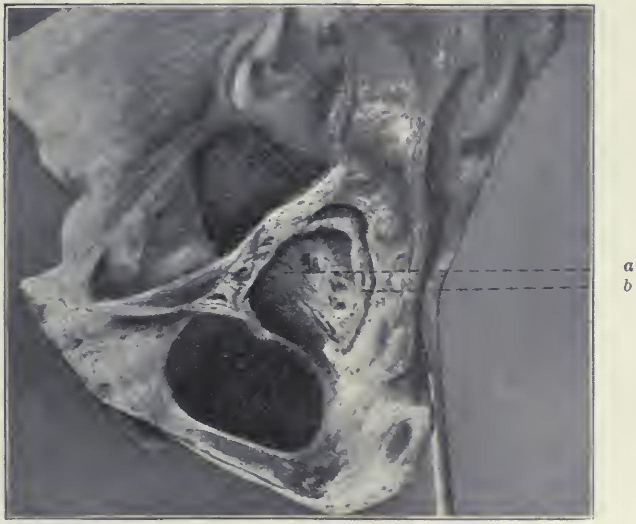
while the height is 4 cm. The fossa acetabuli occupies the greater portion of the area. The location of the cartilaginous rim is approximately the same as the right acetabulum. The thickness of the bony base of the acetabulum is 1 cm.

Femur. The *head* of the femur shows the same general appearance as that of the right femur, but the depression for the insertion of the ligamentum teres is more marked and is surmounted by a well-marked tubercle. The surface of the head below this depression is smooth, and apparently was cartilaginous articular surface. The highest point of the head is 1 cm. below the top of the great trochanter.

The *neck* is very short, and makes an angle of almost exactly 90° with the shaft.

The shaft shows an outward bowing, corresponding in position and amount with that of the right shaft. The angle of torsion is 31° greater than in the normal hip.

Fig. 10.



Specimen B. Left acetabulum. Acetabulum triangular (*a*), facing almost directly outward. Narrow cartilaginous rim (*b*).

Ligaments and *muscles* are wanting.

Specimen C is an alcoholic preparation of a case of double congenital dislocation of the hip from a child ten and a half years old. The left hip had been operated upon by the old Hoffa method, and the child died during an epidemic of diphtheria one month later. This operation disturbed the relation of the soft parts, and they were still further changed by a partial dissection before the specimen was presented to the museum. The right hip was intact. Each hip is described separately.

Right Hip. The head of the femur is dislocated directly upward and very slightly forward, and rests entirely above the acetabulum upon the external surface of the ilium. In spite of this abnormal position of the head of the bone, the lower end of the femur looks directly forward, as in a normal knee. This is due to the fact that there has been an increase in the amount of femoral torsion, as will be shown later. The joint capsule is opened above by an incision in the long axis of the neck of the femur. The entire femur is sawed open vertically in a plane with the long axis of the neck of the bone.

Acetabulum. The acetabulum is approximately triangular. It faces outward and slightly downward and shows a moderate overhanging of the lip. Its base is just above and directed toward the obturator foramen. Its apex is directed nearly vertically upward when the pelvis is held in normal position, and terminates just below and behind the anterior inferior spine of the ilium. The exact measurements cannot be obtained without sacrificing important structures that it is desired to keep. The cavity looks almost directly outward, and is much shallower than normal, but there is a moderate overhanging of the upper lip.

FIG. 11.

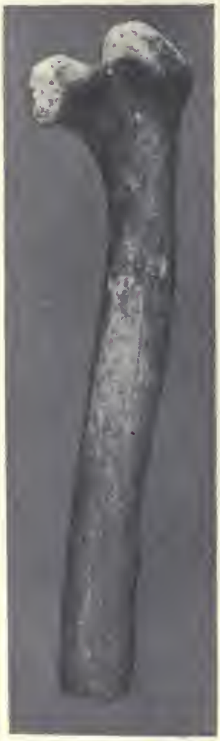


FIG. 12.

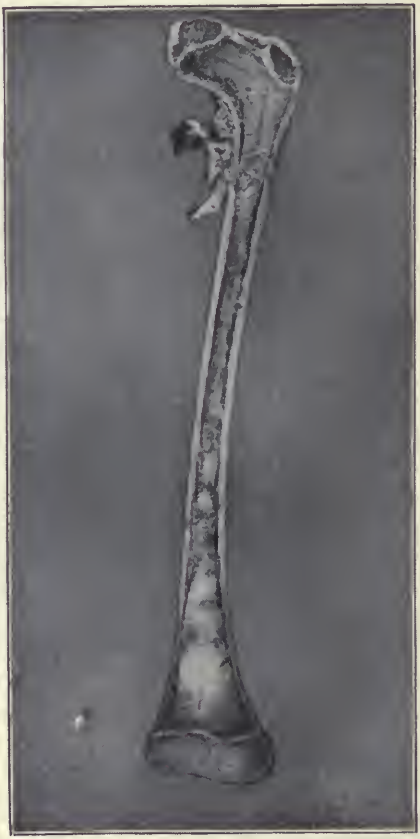


FIG. 11.—Specimen B. Left femur, front. Irregular head, short neck, joining shaft at angle of 90°. Top of great trochanter above level of head.

FIG. 12.—Specimen C. Right femur, anterior half, vertical section, seen from behind. Small head, slightly shortened neck. Neck joins shaft at an angle of 105°.

The fossa acetabuli is larger than normal, and is covered by a thin layer of synovial membrane, which shows numerous small papillary growths.

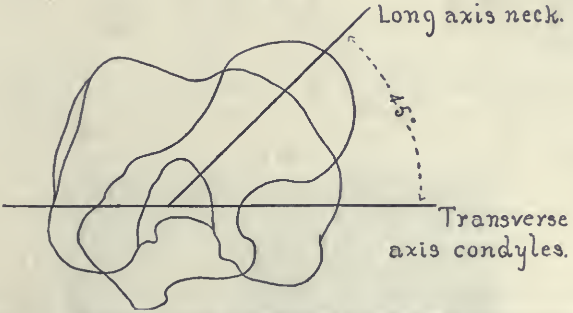
Femur. The *head* is abnormally small, represents approximately two-thirds of a hemisphere, is smooth and covered with cartilage. It presents no depression for the insertion of the ligamentum teres, but instead the cartilage is thickened at that point.

The *neck* appears to be of little less than normal length. It is much thickened vertically, and joins the shaft at an angle of 105°.

The *shaft* shows no lateral curve, but is slightly convex forward. The angle of torsion is greater than in a normal femur. Projected upon a vertical plane the long axis of the neck of the femur cuts the transverse axis of the condyles at an angle of 45°.

Ligaments. The *capsular ligament* presents extreme peculiarities. Below it is attached to the rim of the acetabulum. Laterally it is attached about 0.5 cm. outside the cartilaginous portion of the acetabulum, and consequently the attachment of the capsular ligament is over a narrower area near the apex of the acetabulum. Just above the apex of the acetabulum the capsular ligament is thickened into a rounded ridge of dense fibrous tissue, lined by synovial membrane. This ridge forms a firm retaining wall below the cavity in which the dislocated head of the femur lies, and offers an obvious obstacle to reduction of the head of the femur into the original acetabulum. Above this thickened ridge for a distance of from 2.5 to 3 cm. the capsular ligament is closely adherent to the external surface of the ilium. From the upper limit of this attachment the capsule is reflected outward, beneath the gluteal muscles, and invests the head and a portion of the neck of the dislocated femur. There are numerous adhesions between the inner surface of this reflected capsule and the cartilaginous head. The attachment of the capsule to the femur also is peculiar. The fibres attached to the lower portion of the acetabulum extend to the lower portion of the neck, the fibres attached to the sides of the triangular acetabulum extend to the sides of the neck, while the fibres of the reflected investing capsule extend to the upper surface of the neck.

FIG. 13.



Specimen C. Right hip. Diagram illustrates increase in angle of torsion, 45°.

As a result the capsule as a whole presents the following peculiarities: About the acetabulum the capsular ligament forms a dilated pouch enclosing the dislocated head and neck of the femur. About the original acetabulum it forms a smaller pouch. Between these two pouches

FIG. 14.

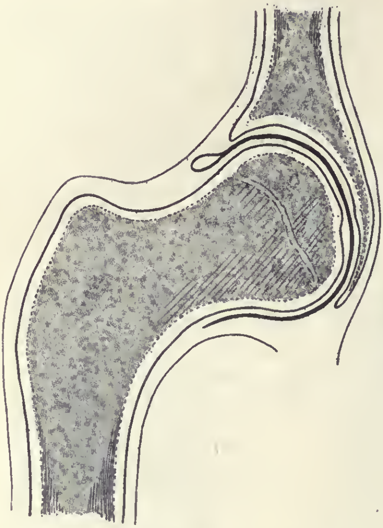
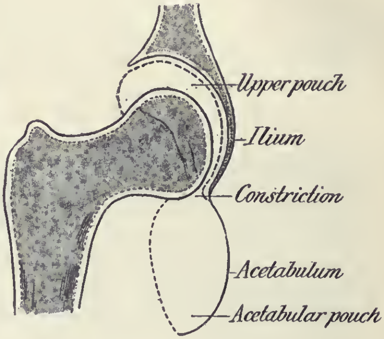


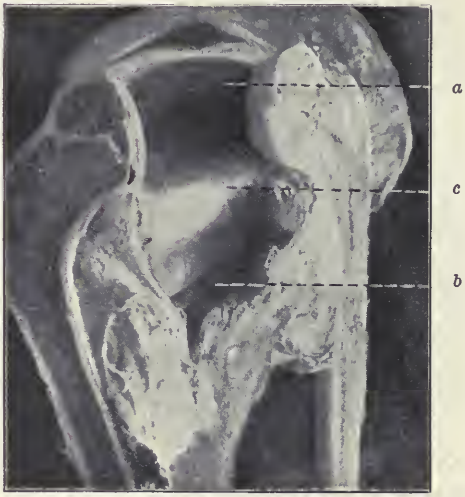
Diagram shows attachment of capsule in normal hip-joint. (After GRAY.)

FIG. 15.



Specimen C. Diagram shows hour-glass attachment of capsule.[1]

FIG. 16.



Specimen C. Right hip. Capsule. Femur is sawn open vertically, and halves are separated. Above is pouch which contained dislocated head (*a*); below is cavity of original acetabulum (*b*). Between the two pouches is thickened rim and constricted neck (*c*).

is a constriction, due to the convergence of the capsular fibres to the sides of the neck of the femur and to the thickening of the capsular ligament into a ridge just above the apex of the acetabulum. Roughly speaking, the capsule may be described as shaped like an hour-glass, or like an old-fashioned silk purse. The upper pouch is adherent to the surface of the ilium internally and to the gluteal muscles externally; the lower pouch surrounds the original acetabulum. The constriction is too small to admit of the passage of the head of the femur.

---

[1] The apparent cavity above the acetabulum is an error in the drawing and did not exist. The same is true of Figs. 18 and 19.

The capsule everywhere seems thicker than normal, and is especially thick where it is attached to the ilium.

Muscles. As far as can be judged without a dissection that would destroy the specimen, the muscles present no obvious abnormality. It appears that muscles offer but moderate resistance to reduction of the deformity. Attempts to reduce the head of the femur in this specimen brings tension upon the capsular ligament, and but little upon the hip muscles, except upon the adductors.

Left hip. The operation upon the joint materially disturbed the relations of capsule and soft parts, and the extensive dissection of the specimen before it was presented to the museum allows only certain features to be studied.

Acetabulum. The acetabulum is triangular, and occupies the same relative position as the right acetabulum—*i. e.*, its base is just above and directed toward the posterior margin of the obturator foramen, while its apex is directed upward and slightly backward and outward, and terminates just below and posterior to the anterior inferior spine of the ilium. The acetabulum faces almost directly outward, with moderate overhanging of the upper lip. The width of the base is 3.75 cm., the height of the acetabulum is 4.4 cm. The width of the cotyloid notch is 2.5 cm. The fossa acetabuli is relatively large, and is filled by a mass of fat, covered with synovial membrane, which in places is covered with papillary growths. The sides and apex of the acetabulum are covered with a layer of cartilage about 1 cm. in width. The acetabulum is shallow, only 1.4 cm. at the deepest point.

Femur. The *head* is small and rather conical. Below its centre is an ovoid depression, as if for the insertion of a ligamentum teres. The upper two-thirds of the head are covered with rather roughened cartilage, while below the depression it is denuded of cartilage and very rough. It is impossible to say whether this roughness is natural or is an artefact.

The *neck* is slightly short, but is thickened vertically. It joins the shaft at an angle of 105°. There is no outward bowing of the shaft, but there is slight convexity forward. There is a marked increase in the angle of torsion. The long axis of the neck intersects the transverse axis of the condyles at an angle of 45°.

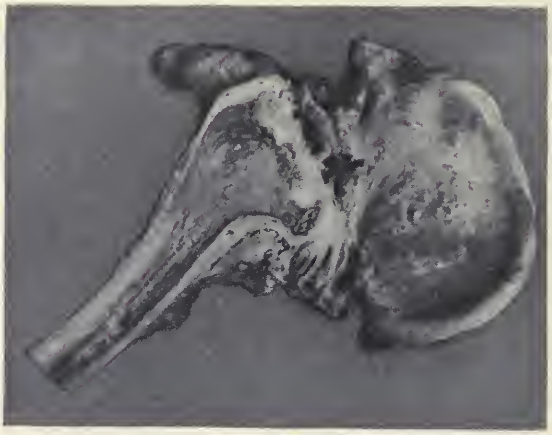
Ligaments. The *capsule* is largely destroyed, but sufficient remains to see that it was attached to the external surface of the ilium for a distance of 4 or 5 cm. above the acetabulum. From the upper margin of that attachment it was reflected outward to invest the head and neck. The attachment to the femur is so extensively divided that only a firm fibrous band ("Y" ligament?) is left, extending from the anterior inferior spine of the ilium downward to be attached to the anterior intertrochanteric line. The ligament is so short that when the head of the femur is placed in the acetabulum the femur is flexed at an angle of 45°, and when the femur is extended the ligament tends to reproduce the dislocation. The remnants of the capsular ligament everywhere are thickened.

Muscles. The muscles have been destroyed so extensively that their arrangement cannot be studied.

Specimen D is an alcoholic preparation of a case of congenital dislocation of the right hip from a child aged four years, who died of scarlet fever without operation. The specimen includes the right innominate bone and 10 cm. of the upper end of the femur. The specimen was somewhat mutilated during removal, and is the least satisfactory of the specimens. The head of the femur is dislocated upward and forward, and rests upon the external surface of the ilium, with the femur rotated outward.

Acetabulum. The acetabulum is approximately triangular, with the base of the triangle just above and directed toward the obturator foramen. The apex of the acetabulum extends upward to just below and behind the anterior inferior spine of the ilium. Exact measurements cannot be obtained without destroying certain features it is desirable to retain. The cartilaginous rim of the acetabulum is exceedingly narrow. The fossa acetabuli is relatively large, roughened, and filled with a mass of dense fibrous tissue. The acetabulum is very shallow and looks almost directly outward.

FIG. 17.



Specimen D. Shows external surface of iliac bone and vertical section of femur. Head is dislocated upward and forward, and lies on external surface of ilium. Head is very small, and is lower than top of great trochanter. The neck joins the shaft at an angle of 100°.

Femur. The *head* of the femur is exceedingly small, very irregular in shape, but covered with cartilage. Below the apex of the head is a slight depression, apparently for the insertion of a round ligament.

The *neck* of the femur is exceedingly short, is contracted vertically, but widened laterally. The neck joins the shaft at an angle of 100°. The angle of torsion is very much increased.

The *shaft* is small and flattened laterally, but shows no lateral curve.

Ligaments. The capsular ligament everywhere is exceedingly thick. The acetabulum is filled with a mass of compact fibrous tissue, which extends in dense bands to the lower portion of the neck. These bands are so short as absolutely to preclude forcible correction of the dislocation. Above the acetabulum the capsule is attached to the upper rim of the acetabulum, and, for a distance of 2 to 3 cm., to the external surface of the ilium. From the upper margin of this attachment the fibres are reflected outward, beneath the gluteal muscles, and invest the head and neck of the femur. All the fibres of the capsular ligament are inserted into the neck near the edge of the articular cartilage. In places the capsule is bound to the cartilaginous head by dense fibrous adhesions. As a whole, the capsular ligament presents the following peculiarities. Above the acetabulum the capsule is dilated and forms a pouch which encloses the head and neck of the femur. This pouch is attached to the external surface of the ilium for a considerable distance, 2 to 3 cm. above the acetabulum. The acetabular portion of the capsule is obliterated by the attachment of the fibres of the capsule to the base of the fossa acetabuli. Between the head of the femur and the external surface of the ilium the capsule is extremely thick and forms a cushion upon which the head rests, with no sign of any articular depression upon the ilium. The thickness of the capsule, the firm adhesions, and the very short fibres seem to make any attempt at forcible reduction impossible.

FIG. 18.

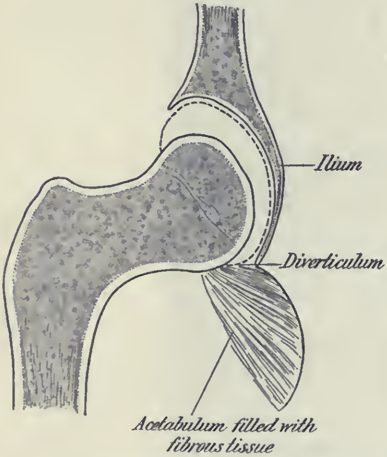


FIG. 19.

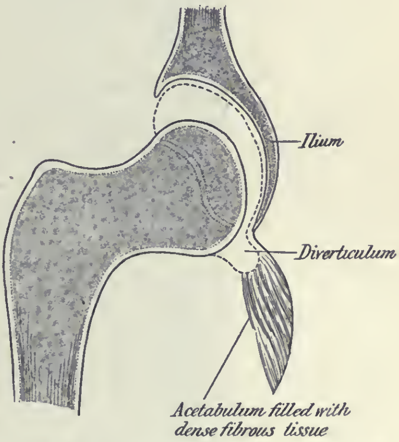


FIG. 18.—Specimen D. Diagram illustrates line of capsule. Acetabulum is filled with dense fibrous tissue. Pouch for head of acetabulum is very small.

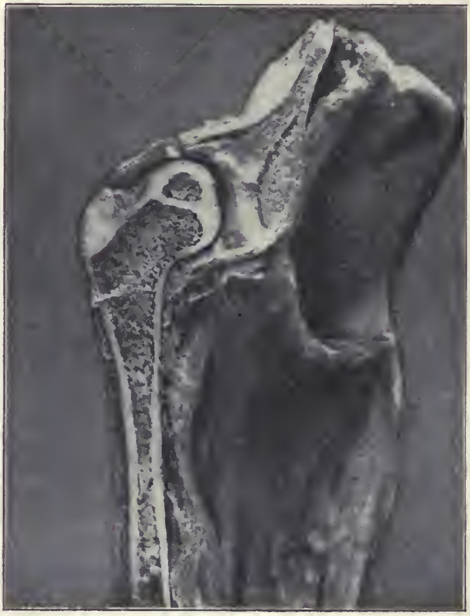
FIG. 19.—Specimen E. Diagram to illustrate shape of capsule. Acetabulum is filled with dense fibrous tissue except at apex, where there is a small diverticulum from main pouch.

Specimen E is an alcoholic preparation of a case of double congenital dislocation of the hip of a child four years of age. The left hip was corrected forcibly, and the deformity was reduced, but recurred two months later. The same hip was then operated upon by the open method, and, as the specimen shows, the deformity was corrected. The child died seven months later of whooping-cough. The right hip was untouched. Each hip is described separately.

Right Hip. The head of the femur is dislocated upward and forward, so that the head lies upon the external surface of the ilium, just above and slightly posterior to the apex of the acetabulum.

Acetabulum. The acetabulum is approximately triangular in shape with a considerable overhang of the upper lip, but is more oval than any of the preceding specimens. The base of the acetabulum is directed toward the obturator foramen, the apex is just below and posterior to the anterior inferior spine of the ilium. The fossa acetabuli is relatively large, although less so than in any of the preceding specimens. The rim of the articular cartilage is correspondingly small. The fossa acetabuli is filled with a mass of dense fibrous tissue, except at the apex, where it is filled with fat, covered with synovial membrane.

FIG. 20.



Specimen E. Right hip. Shows small head, short neck, which joins shaft at angle of 110°. Main pouch and diverticulum can be seen.

The acetabulum as a whole is shallow, about 1 cm. deep at the deepest point, but instead of facing almost directly outward, as the other acetabula do, it faces slightly downward, and offers a better cavity to receive the head of the femur than do any of the other specimens.

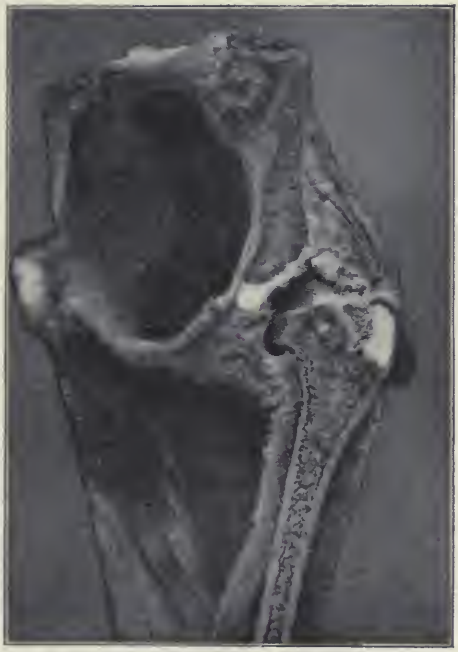
Femur. The *head* is relatively small, more conical than spherical, and entirely covered with cartilage. Just below the apex of the head is an oval depression, apparently for the attachment of a ligamentum teres.

The *neck* is short, and much thickened vertically. It joins the shaft at an angle of 110°. The apex of the head is but very little above the top of the great trochanter.

The *shaft* shows no lateral curve. The angle of rotation is much increased. Projected upon a horizontal plane the long axis of the neck intersects the transverse axis of the condyles at an angle of 50°.

Ligaments. As in the preceding specimens, the *capsule* presents the greatest irregularities. In this specimen the capsule externally is inserted into the neck of the femur, just outside the margin of the articular cartilage. From this line of insertion the capsule invests the head in a closed sac. One side of the sac is attached to the external surface of the ilium for a distance of about 2 cm. above the apex of the acetabulum. The outer surface of the sac is beneath and adherent to the deep surface of the gluteal muscles. In this specimen the capsule shows but little of the hour-glass shape, but is rather a spherical bag, closely investing the head of the femur, with a small diverticulum extending into the apex of the acetabulum. The iliac layer of the sac is extremely thick, and forms a dense cushion upon which the head of the femur rests. There is no evidence of an articular surface upon the ilium.

FIG. 21.



Specimen E. Left hip. Shows head of femur lying in acetabulum. Neck joins shaft at an angle of 115°.

There is no true *ligamentum teres*, but there is a thin, ribbon-like band of fibrous tissue, which extends from the depression in the head of the femur already mentioned to the front of the internal surface of the capsule.

There is no evidence of a *cotyloid* ligament about the cartilaginous rim of the acetabulum.

Muscles. The adductor muscles only offer marked resistance to the reduction of the deformity.

Left hip. As already stated, the left hip was corrected forcibly, and the deformity recurred. Later the deformity was corrected by an open incision. Consequently nothing can be said as to the nature of the dislocation or the relations of the soft tissues. At autopsy the head of the femur was found lying in the original acetabulum, which is sufficiently large to hold and retain it. Although the head of the femur is in the acetabulum, the plane of the condyles of the femur, instead of facing directly forward, is rotated on a vertical axis, so that the internal condyle is further back, the external further forward than normal, and the knee as a whole faces inward.

Acetabulum. The acetabulum cannot be thoroughly examined without destroying certain features that it is desired to preserve. As a whole, its relative position corresponds to that of the left hip.

Femur. The *head* is more nearly spherical than the right and is covered with cartilage. There is a slight depression in the apex of the head as if for the insertion of a ligamentum teres. The head is but slightly above the top of the great trochanter.

The *neck* is relatively somewhat short, and is much thickened vertically. The neck joins the shaft of the femur at an angle of 115°.

The *shaft* presents no lateral curve. The angle of femoral torsion is increased to 43°.

Capsule and *ligaments* have been destroyed, so that no statement regarding them is possible.

Conclusions. From the examination of these specimens of congenital dislocation of the hip it appears that:

1. As a whole, the anatomical conditions vary within considerable limits in individual cases.

2. Certain anatomical conditions, particularly the peculiarities of the bones, are tolerably constant.

3. The acetabulum is triangular, with its apex directed upward, shallow, faces more or less directly outward, and often is insufficient to retain the head of the femur in place, even if reduction is accomplished.

4. A new articular surface to receive the dislocated head of the femur sometimes is present upon the surface of the ilium.

5. The head of the femur is small, its articular area is diminished and irregular in shape.

6. The neck of the femur generally is short, and makes with the shaft an angle approximating a right angle.

7. The angle of femoral torsion is very much increased by adaptive rotations of the femur upon its vertical axis, so that the knee is brought directly forward. Hence, if reduction is accomplished the knees will tend to face inward, and a secondary osteotomy may be required.

8. Sometimes the shaft of the humerus has an outward convexity in the upper third.

9. The capsular ligament always is irregular, but the irregularity is variable. The capsule may be hour-glass shaped. Then the upper

dilatation is attached to the external surface of the ilium, and encloses the dislocated head of the femur, and is covered by the gluteal muscles. The lower dilatation encloses the original acetabulum. Between the two dilatations is a constricted neck, which may be too small to permit reduction of the head. Or the capsule may not be attached to the rim of the acetabulum, but may form a small globular sac about the head of the femur, attached to the external surface of the ilium. Or from such a globular sac a diverticulum, lined with synovial membrane, may extend into the apex of the acetabulum. The capsular ligament may be too short to allow the head to remain in the acetabulum, even if reduction is possible.

10. The ligamentum teres is absent in the cases examined.

11. The cotyloid ligament is small and thin and shows only at the apex of the acetabulum, or may be entirely wanting.

12. The capsular ligament is thickened throughout, and may show an especial thickening just above the apex of the acetabulum, so as to form a retaining lower rim for the false acetabulum, and form an obstacle to reduction of the head.

13. Only the adductor muscles offer marked resistance to reduction of the deformity.

SUMMARY. Judging from the examination of these specimens the anatomical peculiarities in congenital dislocation of the hip are:

1. A dislocation of the head of the femur upward and slightly forward upon the surface of the ilium.

2. A shallow, triangular acetabulum, which faces more or less directly outward.

3. A diminution in size of the head of the femur.

4. A diminution of the angle between the neck and shaft to nearly a right angle.

5. An increase in the angle of femoral torsion.

6. A capsular ligament, in the form of an hour-glass or a simple sac, adherent to the surface of the ilium above, sometimes dilated about the acetabulum below, and constricted about the neck of the femur.

The obstacles to the reduction of the deformity are:

1. The peculiar attachment of the capsular ligament, which causes a shortening of ligamentous bands at various points, chiefly laterally and below.

2. Constriction of the middle of the capsule, so that it may be impossible to draw the head of the bone through the constriction.

3. Thickening of the capsule just above the apex of the acetabulum.

4. Adhesions between capsule and head of the femur.

5. Contraction of the adductor muscles.

6. An increase of femoral torsion so that when the head of the femur is placed in the normal acetabulum the knee looks inward.

Obstacles to retention of the head of the femur after complete reduction are:

1. A flattened or insufficient acetabulum, placed too obliquely.
2. An insufficient head.
3. An extremely short neck of the femur.
4. Obliteration of the cavity of the acetabulum by a mass of dense fibrous tissue.

From these specimens it is evident that under some circumstances the capsule is narrower than the head in the portion between that covering the head and that covering the acetabulum. In some cases, also, this narrowed portion of the capsule is too strong to be readily dilated, and it may be regarded as a displaced cotyloid ligament lying in front of the head instead of around the neck. Where this is the case it is impossible to dilate it, and the structure must be cut if a complete reduction is desired. If this division could be done with slight risk, it is manifest that it is better surgery to divide it than to rely on the uncertain and slower process of absorption by pressure. It is impossible to say in how many instances this condition of the capsule persists.

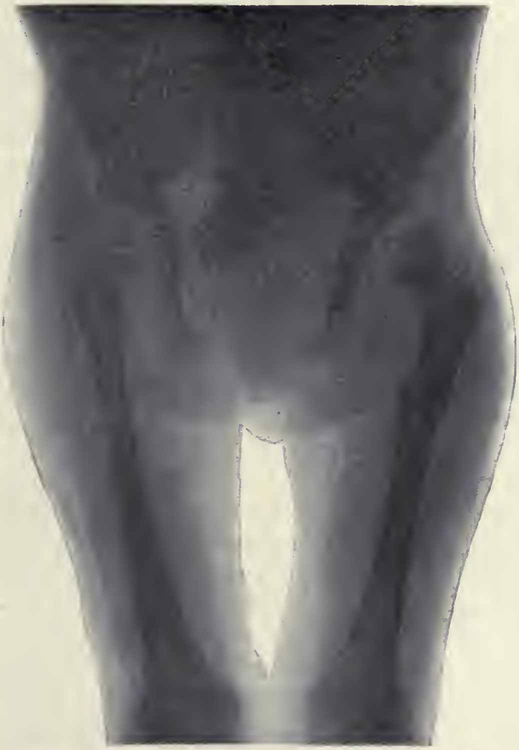
In other instances the acetabulum is placed at too slight an obliquity to hold (or has too little a projecting lip) the reduced head firmly. This would appear to be a rare condition, though it is indicated in the skiagraph. Where it is present either the curette must be used or the acetabulum deepened by continued pressure of the femur inward for a sufficiently long time as to make the position secure by promoting firm growth of the capsule holding the head of the femur in place.

Where there is an abnormality in the axis of the neck to such a degree as to occasion either inversion or eversion of the foot too great to secure a normal relation of the head with the socket, dislocation will recur unless the twist is avoided. This can be readily done by an osteotomy of the femur below the lesser trochanter. It is necessary, as Lorenz has shown, to place the head of the femur well in the acetabulum, and relapses will occur if this is not accomplished, or if it is not retained for a sufficient length of time for the adjustment of the soft parts.

It is also necessary for the pelvi-trochanteric muscles to have time to become shortened by adaptive shortening in order to keep the head of the femur well against the socket. The increased distance between the acetabulum and the femur and lack of close coaptation is seen in the skiagraph picture of a reduced case as well as the lack of a stray projecting lip of the acetabulum.

In forcible reduction a fold of the capsule lies between the head of the femur and the acetabulum, the relapse is liable to occur if the tissues are so firm as not to be penetrated by the pressure of the head thrust into the acetabulum. A relapse also occurs in case the head is not sufficiently under the shoulder of a projecting upper lip of the acetabulum. Where this anatomical variation exists it is necessary that the limb be left in an abducted position for some time, until the cartilaginous tissues become sufficiently firm to hold the head of the femur in place. It is also necessary, as Lorenz has shown, that the head be well thrust into the acetabulum. A relapse is liable to occur also from obliquity of the neck. Where the neck is so twisted that when the foot is held in a position usual in walking at right angles to the cross axis of the pelvis, relapse will take place, if, owing to the obliquity of the neck, the head is thrown either too far to the rear or too much in front to be contained within the cup of the acetabulum. Where this takes place an osteotomy is necessary, in order to correct the twist of the femur. This has been done in the case illustrated in Fig. 22. It is needless to say that if any of the soft tissues remain contracted to such an extent as to

FIG. 22.



Skiagraph of congenital dislocation reduced by open incision, with subsequent osteotomy to correct increased femoral torsion.

prevent the head from being placed well in the acetabulum a relapse is liable to occur.

Another cause of relapse may take place in case the pelvi-trochanteric muscles have been so far lengthened by the abnormal position as not to hold the head of the femur well into the socket after the reduction. Where this is the case the femur must be kept well fixed for several months in a position in which the muscles will have an opportunity to contract, or the attachments of the muscles should be cut down on and set well back on the insertion of the trochanter. This can be done if an open incision is tried.

Deformities of the shape of the head or in the acetabulum, which make a reduction impossible, are exceptional in young children. Where they occur a perfect result cannot be expected.

The development of the successful treatment of congenital dislocation of the hip will depend upon the accumulation of experience guided by thorough pathological knowledge. In treatment of this sort the skiagraph is of great value. It is, however, not of as great a value as it is desired, owing to the fact that the rays will penetrate the cartilage and leave a great deal to the imagination for interpretation. If the X-ray is perfected to the extent of enabling us to see more perfectly the condition of the hip-joint before and after treatment, and at the different stages of treatment, it is reasonable to presume that greater certainty in the results can be obtained.

The permanency of the benefit to be obtained from the correction of congenital dislocation of the hip has been well demonstrated by cases where reduction has remained permanent after three or four years, but the subsequent growth of the limbs ten years or more after operation has not yet been demonstrated. That, however, the growth would be better and the use of the limbs greater if the head is in the socket than if it is out of the socket is probable if not certain. The difficulties in correction of congenital dislocation have been so fully discussed that further mention of this is not necessary in this paper, which is intended to emphasize the necessity of thoroughness in after-treatment to prevent relapse.

A FIFTH CASE OF FAMILY PERIODIC PARALYSIS.[1]

By Leo M. Crafts, B.L., M.D.,
DEAN AND PROFESSOR OF NERVOUS DISEASES IN THE MEDICAL DEPARTMENT OF HAMLINE UNIVERSITY, MINNEAPOLIS.

Several European writers have described and reported cases of a very rare and striking condition to which the name of "family periodic paralysis" has been given. This name is of no scientific value, and applies only from the fact that the great majority of all cases have been reported in groups in families. While a small number of imperfectly studied cases have been published in this country, only three of them strictly conform to the condition. One of these was reported by Burr in 1892, and the other two by Taylor, of Harvard, last year. The latter writer analyses the existing literature on the subject exhaustively, and gives the complete bibliography. But he does not carry out as extensive analyses of his own cases as could be wished in the direction of pathological findings. Dr. John K. Mitchell, of Philadelphia, last month (May, 1899) reported a fourth case at the meeting of the Association of American Physicians in Washington, and Dr. J. J. Putnam, of Boston, has recorded a similar case. It is a rather remarkable coincidence that the three cases should have come under observation simultaneously, especially considering the extreme rarity of the symptom-group.

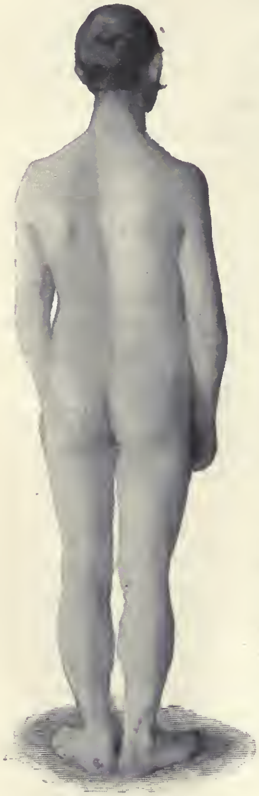
The subject of this paper—J. W. S.—has been under observation at intervals for about seven years. He is a commercial traveller, aged thirty-five years, single, of dark complexion, short, and of moderately heavy build of body; forehead slightly receding; the ears are large, and stand out prominently from the head. The hands are large and heavy, the finger nails very large and markedly convex. The feet are unusually large. His gait when walking is slightly waddling in character, suggestively like that of the early stage of muscular dystrophy, of the hypertrophic type, and he runs in a clumsy way, but there is no evident weakness and he is not at all insecure on his feet. Mentally he is keen and active; is rather explosive and boisterous, but sensitive and energetic. He is left-handed, and his physical development is quite remarkable (Fig. 1). The lower legs, the hips, and the thighs are abnormally large, strikingly like those of pseudomuscular hypertrophy, and the lumbar curve is emphasized. The arms, too, are moderately heavy; but his muscular strength does not correspond at all to the development, and while it is not weak it is distinctly less than normal, and he has comparatively little power of endurance. He is five feet five inches in height, and weighs one hundred and forty pounds. The calves measure fifteen and one-quarter inches, the thighs nineteen and one-quarter; the forearms eleven inches, the upper arms the same. The superficial veins in both upper and lower extremities are very large and prominent.

---

[1] Read before the Minnesota State Medical Society, June. 1899.

His family history is distinctly neuropathic, but traced back in all directions for three or four generations is entirely negative, showing nothing approaching his condition. Two more or less remote ancestors died of "paralysis." One aunt died of asthma and cardiac disease, and another aunt is markedly eccentric. His father was a heavy drinker; his mother was frail. She had three children. All the births were very hard, and she died in the delivery of the last child. The subject of the paper was the oldest and the only one that survived beyond infancy. When a child he was wilful, and destructive in disposition. He was twelve years old when the present condition made its advent. Very early one morning he was awakened by a disturbance in the house caused by the sickness of a relative, and his grandfather going for the doctor. He tried to get out of bed, but found he could move his arms and legs but little and only with great difficulty. He finally squirmed to the edge of the bed, and succeeded in getting on his feet and to the head of the stairs. He did not dare to try to walk down them, so he sat down and slid carefully from step to step. When he reached the bottom he fell in a heap, and had to be carried to bed, where he had to stay for two days, entirely unable to move any of his extremities. He got up and about all right on the third day. About six months later the second attack occurred, and they have returned at irregular and widely varying intervals since that time. About a year after the first attack, in the fall, he fell into cold water and was badly chilled. The next day the condition appeared and was very severe. The heart's action is said to have been suspended temporarily, and consciousness lost for a brief period. About three years later an attack was accompanied by complete obstipation, and the history indicates that the condition was extreme. The most serious attack, probably, that he has had occurred three years ago, following extreme exertion for a day, going without his dinner as well. The next morning the condition began to develop, became complete during the following night, and remained for nearly three days. There was almost constant vomiting, fluid in character, and with large quantities of bile. Marked exhaustion developed, his color became bad, and his pulse very weak, small, and rapid. This attack I had under continuous observation throughout, and the condition was alarming. Except for this instance the later attacks have not been so severe or frequent as the earlier ones.

Fig. 1.



At times, when the seizures are occurring with greater frequency, his color is sallow, and he loses flesh. They are at times preceded by constipation, at times by diarrhœa, more frequently the former, but almost constantly by one or the other. They occur very often from over-exertion, either prolonged or short and extreme. One attack developed immediately following a sharp run of a short distance to catch a train while carrying two heavy grips. Indiscretions in diet seem to have a direct bearing on the occurrence of the condition, and he has learned to avoid certain foods, such as rich pastry, sweet preserves, and cheese. The individual seizures vary somewhat in time of onset, but come on probably more frequently at night, as they also more often disappear during the night, but they may begin to develop or leave at any time in the twenty-four hours. At times there is only moderate loss of motor power, confined to the hands and feet, which gradually wears away, or the paralysis may vary in any degree from this to complete motor loss in the entire spinal distribution. The cranial nerves escape in the main, but he is not able to open his mouth widely. There is no difficulty in swallowing.

In duration the attack varies from a few hours to about three days. The onset is always gradual, usually beginning in the hands and feet about simultaneously. Of late they have often begun in the hands and wrists first, due to pressure on his hands resting forward on the handlebars of his bicycle. Motion at first becomes slightly clumsy. He is unable to button his clothing ; locomotion becomes difficult, and the gait peculiar. The foot is dragged and flopped forward, as the paralysis is flaccid. Continual, moderate activity, especially walking when he feels an attack beginning, will at times stop its development ; and the application of strong constant and faradic currents has occasionally accomplished the same result. Too great activity, also, when an attack is subsiding will often cause its return, sometimes changing an apparently partial seizure into a complete one.

In the extreme condition all muscles of the extremities, body, and neck are entirely relaxed. The fingers have a slightly waxy feeling, and the leg muscles seem a little dense. The abdominal muscles are without tone, and normal contraction of the abdominal wall is impossible. The chest wall hardly moves at all on respiration, which seems entirely confined to movements of the diaphragm. Coughing is impossible, and a sneeze is a very weak effort. He cannot turn the head at all on the pillow, and when he is lifted into a sitting position it falls uncontrolled in any direction. The skin is pale, but otherwise appears and feels normal. There are no manifest vasomotor disturbances, and absolutely no sensory changes of any sort, and no pain, but he tires quickly in any one position and asks to be turned and moved frequently.

Electrical response depends on the extent and completeness of the paralysis. The normal reaction of both muscle and nerve to either galvanism or faradism diminishes in proportion to the motor loss in the muscle under test, and tetanizing currents will elicit absolutely no response when the paralysis is complete. The change is purely quantitative in character, the cathodal always exceeding the anodal response, but the contraction, in a partial seizure, is distinctly slow. The tendon reflexes are abolished, the plantar is gone, but the cremasteric is at times present in slight degree. The erectile centre is not disturbed. The pupils are normal, and the special senses are not involved. There is no desire for food throughout the attack, and usually none is taken. Vomiting occurs at times but not frequently. Distressing hiccough has developed occasionally. All action of the bowel and bladder is suspended, and although tenesmus is present, especially toward the end of the attack, evacuation of the bladder is impossible, often with repeated attempts, a condition partially of retention and in part of suppression. The occurrence of micturition indicates the beginning recession of the attack ; but a sharp congestive headache is ordinarily the first sign that it is beginning to disappear. Beginning slight power of motion then makes its advent slowly in the extremities, first in the arms. The condition subsides gradually as it developed, requiring several hours to disappear entirely. And all the muscles feel sore and stiff for a day or two, when he goes about his ordinary duties in a perfectly normal manner. Electrical response returns slowly, keeping pace with motor power.

During the attack the pulse is always accelerated, more so when the condition is profound ; the heart's action is weaker and the pulse tension is lower. The beat is often dichrotic. The sounds are soft but no murmurs have been detected, and no change in the area of normal dulness.

The few cases so far reported give an identical syndrome, and establish the affection as a distinct entity. The periodicity of the attacks, the flaccid motor paralysis, the loss of the reflexes, the remarkable electrical changes, the entire freedom of the sensory sphere, and the normal health in the intervals make a very striking clinical picture.

Examination and analysis of the blood, urine, and feces have been most carefully made by Dr. A. F. Irwin, professor of pathology in Hamline University, and he has given me the following complete report which is of especial interest and value because of the findings in the fecal analysis :

Blood.

During attack.		Interval.
Specific gravity, 1057½		
Hæmogloin 90–95 per ct.	Fleischl Gowers	90–95 per cent.
Leucocytes (300 counted)	Lymphocytes, 53 per cent.	40 per cent.
	Neutrophiles, 42 "	55 "
	Eosinophiles, 5 "	5 "
Alkalinity diminished (Engel)		Normal.

Urine (500 c.c. in each test).

Attack.		Interval.
Specific gravity, 1023		1021½
Reaction, neutral		Neutral.
Urea, 14.54 grms.		12.32 grms
Total nitrogen 8.45 (Kjeldahl's)		6.70 "
Uric acid, 0.356		0.284 "
Chlorides, 3.5		3.333 "
Xanthin bases, 0.254		0.057 "
Phosphates (P 203)	Alkaline, 0.243	0.524 "
	Earthy, 0.743	0.357 "
Sulphates (S 03)	Preformed, 1 435	1.022 "
	Ethereal, 0.445	0.123 "

Urine. Nothing unusual was found on microscopical examination. Injection of 1 c.c. of urine produced death in a rabbit in twenty-four hours. The symptoms were those of a toxæmia rather than of muscular paralysis. There was congestion of the kidneys, liver, and spleen, and death was undoubtedly caused by pulmonary œdema.

The most notable increase is in the ethereal sulphates. This is exactly what is to be expected on account of the breaking up of the toxic materials in the intestine and their elimination as sulphates. To some extent the diminished excretion of uric acid is compensated by the lack of oxidation of its antecedent, as is further confirmed by the marked increase of xanthin bases.

Blood. During the attack there was a marked lymphocytosis, which declined to almost normal within two days following the attack. However, these xanthin compounds are nuclein bases, and it may be possible that the lymphocytosis might cause an increased formation and excretion. Neubauer has been followed in his plan of separating them.

Feces. I obtained for analysis, and confirmed it by a second analysis. The first movement after an attack I took different portions and subjected them to the ordinary methods of isolation, viz., Brieger, Stas Otto, and Dragendorff. After using the ordinary procedures in these cases I again extracted it with ether, allowed it to evaporate spontaneously, and again obtained an oily mass. This on injection (one gramme) produced in rabbits and guinea-pigs a paralysis which gradually disappeared in forty-eight hours. With HCl the oily mass formed a yellowish crystalline salt (hydrochloride). Among a number of reactions, simulating many of the alkaloids, the following were peculiar :

Platinic chloride,	White precipitate soluble in alcohol (50 per cent).
$H2\ SO4$,	Formed a salt, white, and, on heating, a cherry red.

I am sorry that I cannot as yet tell to what class this poison belongs. Its molecule contains sulphur, and this may explain the increase of ethereal sulphates in the urine.

Saliva. Nothing unusual found. Specific gravity 1003. Sulphocyanide appreciably diminished.

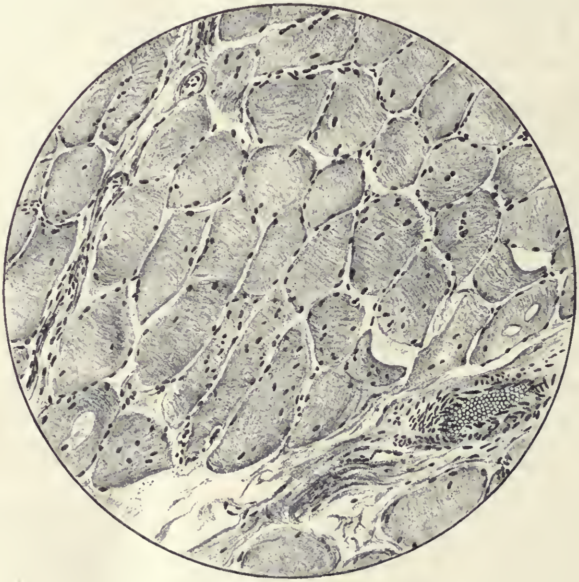
The discovery and separation of this toxic product in the feces by Dr. Irwin, which in control experiments by injection produced motor paralysis similar to that in the patient, and disappearing in the same length of time, would appear to be of great importance and the first light on the pathological basis of this exceedingly interesting and very rare condition, on which investigators have hitherto been entirely in the dark.

The conclusions of earlier observers seeking to link it to hysteria or masked forms of epilepsy were manifestly untenable. Goldflam, Taylor, and Mitchell became convinced of the presence of some form of autointoxication (an opinion shared by the author), but were not able to isolate the poison. Mitchell argues for the probable presence of more than one to account for all the manifestations, but certainly one toxic agent acting on the spinal centres profoundly and temporarily overpowering them could account for all the effects perfectly. It would appear, further, that this poison is developed only at intervals and not constantly, considering the widely varying intervals between the attacks.

The complete identification of the agent has not as yet been possible to determine. And how and why physical over-exertion and gastro-intestinal disturbances evolve this poison in certain individuals remains for future investigation.

Certain peculiarities in the physical development of several of the reported cases are of great interest, and may prove of much importance. The illustrations accompanying this article show the massive muscular supply. This has been noted by other observers, and excised muscle-fibre has been found to be abnormal in several cases. Oppenheim found waxy degeneration; Goldflam reports hypertrophy of the fibres and rarification of the fibrillæ and vacuole formation. In the present case a muscle snip from the inner portion of the right gastrocnemius shows distinct increase in the fibrous tissue and moderate hypertrophy and vacuolation of the fibres. (Fig. 2.) At least one reported case showed actual motor weakening of moderate degree. Bernhardt regards the affection as closely related to the dystrophies, and Taylor and Goldflam consider it to be most closely analogous to congenital myotonia. The family type, the muscular development, reported in enough of the cases to make it unmistakably significant, and the microscopical appearance would indicate a very probable relationship between all three of the conditions, and may establish their nomenclature in a distinct class. No pathology has yet been determined for either myotonia of the dystrophies. The indications of a degree of relationship in the three

FIG. 2.



affections and the poison found and demonstrated in this report would strongly suggest the presence of an identical or similar toxic agent causative in both myotonia and the primary myopathies, as well as in family periodic paralysis.

A definite poison having been determined the way is pointed for the development of a rational method of treatment of an antitoxic nature, but this probably cannot be accomplished until the poison has been fully identified, and the seat of its evolution determined, whether in the muscles or the gastro-intestinal tract.

PERMANENT NON-PROGRESSIVE ATAXIA, WITH A CLINICAL REPORT OF THREE CASES.

By Sanger Brown, M.D.,
PROFESSOR OF NERVOUS DISEASES IN THE POST GRADUATE MEDICAL SCHOOL, CHICAGO.

In the clinical histories which I am about to present I shall describe as minutely as circumstances will permit the primary illness to which the ataxia was secondary, not because I have been able to discover any symptoms therein which might have led me in any way to anticipate what the result would be, for I believe no such symptoms were discernible in the present condition of physiological science, but for the reason that it is interesting to learn, as far as may be, the nature of an illness capable of terminating in such very remarkable phenomena.

Case I. was brought to my clinic, at the Post-Graduate Medical School, by Dr. F. S. Smith, of Nevada, Iowa, who, in the capacity of County Physician at that place, had often observed this patient at the County Farm. Soon after the symptoms from which he now suffers had become established he was brought before a meeting of the County Medical Society, and hence it is probable that the history of the primary disease is fairly correct, because it was evidently repeated by the patient while the main incidents of it were still fresh in his mind.

Case II. was brought to me by Dr. J. Lee Sutherland, of Grand Island, Nebraska, as a private patient, and though he did not attend her during her acute illness, he was careful to verify the history as given.

Case III. occurred in the practice of Dr. H. B. Favill, of this city, through whose courtesy I have been allowed to see it frequently from the onset of the nervous symptoms down to the present time.

My best thanks are due these gentlemen, because, excepting for their kindly interest, I could not have presented this report.

Case I.—A. B., aged thirty years, single, native of Norway, came to America at the age of fifteen; is the eldest of seven children, all of whom, together with the father, are living and in good health. Mother died at about thirty-five, but patient does not know the cause of death. She was large and vigorous, but nervous and subject to the "blues;" wept a great deal, and had a sister with very similar characteristics.

Patient, being large and strong of his age, worked on a farm for three years after coming to this country. In the autumn of 1888, when eighteen years old, he travelled with a threshing machine. The work was at times very laborious, and the hours long and irregular; he often worked far into the night in moving the machine from place to place; slept in barns and under the shelter of straw-stacks; drank some, but never to intoxication, except on two occasions. He denies ever having suffered from venereal disease of any kind.

In the latter part of November, 1888, he began to suffer quite severely from frontal headache, and was soon, on that account, unable to work. About January 1, 1889, became blind rapidly, but not suddenly. From this time he began to lose the use of his legs and arms, and in two or three months was entirely helpless. For a period of several months he continued in this condition, and then began to improve very slowly. A statement from a physician who saw the patient while the pathological process was active is not now available. It does not appear, however, that there was much pain, fever, emaciation, or mental disorder. He does not remember any loss or disturbance of sensation. He cannot say definitely whether he had enough strength in his limbs to move them or not. His statement is, he was simply entirely helpless. His vision slowly improved, and so did the use of the limbs for about a year, since which time he has been practically in his present condition. There has never been any sphincter defect nor any difficulty in swallowing.

The patient enjoys excellent general health, is well-developed, well-nourished, and intelligent. Though he is obliged to live at the Poor Farm and is heavily handicapped by his infirmity, he keeps himself well posted on current events by reading the papers and talking as best he can with those with whom he comes in contact.

All the organs of special sense react normally to the usual tests. General sensation is normal and so are the eye-grounds.* There is no nystagmus.

The sole present disorder consists of intense muscular inco-ordination and great exaggeration of the superficial and deep reflexes. When lying on the back with the legs extended a light tap over the patellar tendon excites a jerk of the whole body, together with a succession of clonic extensor spasms of the leg—a brief, coarse tremor, in fact. There is marked ankle clonus. The reflexes in the arms and jaws are similarly exaggerated. When he attempts to stand the tension exerted on the muscles brings on reflex clonic spasms in the legs, and, as the ataxia is so great that he cannot make any postural changes which might assist him, he promptly falls unless supported. There is no vertigo, and his sense of security is not altered by closure of the eyes. I cannot detect any defect of postural sense.

The hand or foot deviates widely in every conceivable way from the line of intended direction; now approaches the objective point too rapidly, or passes beyond it entirely; then suddenly stops, or is too far withdrawn. Movements requiring co-ordination of the fingers, as in buttoning a garment, feeding himself, etc., are entirely impossible. Yet the gross strength is great. In a finger-locking contest he rarely finds his equal. He delights in the general muscular exercise afforded by rolling about the lawn in suitable weather.

---

* Examined by Dr. Casey Wood.

All attempts to perform definite voluntary movements are attended with marked and pretty general associated movements in other muscles, including those of the face. The muscles concerned in articulation are also profoundly affected, so that articulate speech is practically reduced to a series of guttural monosyllables, strident noises, chest tones and grunts, accompanied by extreme facial contortion. Distinct labial sounds are almost never heard. The voice sounds and grimaces when speaking are much like those observed in some cases of idiocy, so that one might be easily led, on superficial examination, to form an erroneous impression as to the patient's mental state.

CASE II.—A. C., born in Nebraska, in 1870, was vigorous and healthy as a child and young woman. Was married in January, 1889. Her first child was born one year later, without anything abnormal having occurred either during labor or gestation. She continued in good health until June, 1893, when she again became pregnant, and this time, from the first, suffered intensely with nausea and vomiting. In September, when all known remedies had been tried in vain and fatal exhaustion appeared imminent, an abortion was carefully performed. In the course of a few weeks after recovery from symptoms incident to this, which were apparently due to a rather severe sepsis, she was found to be practically in the same condition as when I examined her in September, 1895.

She was well-formed and well-nourished; in fact, appeared to be in good general health, but the ataxia was so great that she could not stand alone, feed or dress herself, although the gross strength was little, if at all, reduced. The knee-jerks were exaggerated, and there was ankle clonus. The skin reflexes were very lively. There were extensive associated movements which were very noticeable in the face, particularly when attempting to talk. The patient would try to speak when asked to do so, and sometimes, also, in order to make her wants known; but the result was practically the same as that already described in Case I. Nothing could be understood, except by one well accustomed to her attempts at articulation. There was no vertigo, no disorder of sensation, or of the organs of special sense. There was no nystagmus. The postural sense was preserved and Romberg's symptom was absent. She was able to read, and took a lively interest in everything that was going on around her. Indeed, there was not the slightest mental impairment.

There was no perceptible change in her condition up to October, 1898, when, after a few days' illness with symptoms of cerebral meningitis, the axillary temperature having reached 105° F., she died. There were no convulsions or paralysis, and the mind seemed clear up to the last.

The family history is excellent, both parents, seven brothers and four sisters being alive and in excellent health. Lues could, I think, be safely excluded, and so, of course, could all kinds of drug addiction.

CASE III.—Mrs. A. D., aged twenty-eight years; American born, good general health up to present illness, but of a highly nervous temperament, which she inherits from the maternal branch of the family. Parents both living and in good health.

Early in December, 1898, when between the seventh and eight months of pregnancy, she suffered with a moderately severe attack of grip, which ran an ordinary course until along about the 17th, when she began to complain considerably of headache, which increased gradually until it became very severe and interfered with sleep for two or three days prior to December 26th ; the pain was especially intense about the eyes and forehead, shifting at intervals of several hours from one side to the other. The character and distribution of the pain were similar to those met with in neuralgia of the first branch of the fifth nerve, though the intermittency peculiar to this latter disease was wanting. Phenacetin in moderate doses gave so much relief as to permit sleep.

On the morning of December 26th, after having been free from pain, and sleeping well without an analgesic, the following symptoms were noted : a tendency to lapse into somnolence with heavy respiration when not engaged in conversation ; outward deviation of the left eye ; dilatation of the left pupil with loss of light reflex, and left ptosis. The knee-jerks on the morning of the 26th were barely present. The speech was slow and articulation somewhat thick. By the evening of the 28th she made no voluntary movements, and paid no attention to the bowels and bladder. No response could be obtained further than that of swallowing liquids when they were put into her mouth. The pupil was fully dilated ; the ptosis was complete ; the outward rotation of the eye was extreme, and the knee-jerks were entirely absent. The temperature was below 100° F., and the pulse below 90. So long as voluntary movements were made they appeared to be equal on the two sides.

On the evening of the 28th she gave birth to a healthy child (second confinement) without showing the slightest sign of appreciation. She recovered from the parturient condition without event, so far, at least, as the pelvic organs were concerned, though there was crural phlebitis not very severe or protracted.

The condition remained practically as described above until about the end of the first week of January, when the pulse and temperature began to rise, and in a few days had reached 135° and 106° F., respectively. There was distinct stiffness of the legs, arms, and neck, though no signs of pain were elicited when the head was drawn forward or pressure made at the nape. The condition was intensely critical for several weeks, when the temperature-curve and sweating led finally to the discovery of an empyema. A resection was made without an anæsthetic, and upward of a pint of thin purulent matter liberated. There was some groaning during the operation, but no voluntary movement.

In a few days after the operation the patient began to show some signs of responding to her nurses ; would put out her tongue and moan and knit her brows when she saw the surgeons coming to dress her wound.

The limbs had remained somewhat stiff ; the thumbs were held firmly against the index fingers ; the hands were partly flexed at the metacarpo-phalangeal joints, and considerable resistance was encountered when abduction of the arms was made, and much greater when abduction of the thumbs was attempted. The legs were much less affected, but passive movements in almost any direction met with some resistance. When the position in bed was such that the body-weight was supported by the left shoulder quite rapid clonic spasms—a coarse tremor, in fact—appeared in that situation; and yet at no time could a reflex movement be excited by tapping a tense muscle or tendon. This rigidity was more marked and has disappeared less rapidly on the left side than the right.

Mental activity gradually returned, then slight voluntary movements of the fingers and toes of the left side. In a few weeks the strength was sufficient to carry the hand to the face, whereupon it was noticed that this movement was accompanied by extreme ataxia, which has continued to the present time—a period of over six months. The hand deviates widely in every direction from the line of intended movement, and the same is true of the leg. Except in the right shoulder, little if any rigidity remains.* Voluntary movement is returning much less rapidly on the right than on the left side. In the right hand it is greatest where rigidity was most marked and persistent, namely, in the abductors of the thumb. As yet only a slight flexion of the right elbow-joint is possible.

The left eye remains turned strongly outward; there is complete ptosis; the pupil is widely dilated and does not react to light, but vision is unaffected. While the acute symptoms were very active the eye-grounds were examined,† and found normal except for the existence of some retinal pigmentation in the left eye, probably the result of an accident suffered in childhood. There has never been any nystagmus.

With a roller crutch the patient walks across the room, but is considerably fatigued thereby. The left foot is raised much too high, and very pronounced ataxia is evident when it is put down. The right foot is barely raised from the floor at all, but is put forward and not trailed. There has never been any vertigo. The tendency to fall is not increased when the eyes are closed, and the posture sense is normal. There has never been any muscular atrophy.

After considerable voluntary power had returned occasional attempts at speaking were made. Only a few simple, isolated words were spoken, however, and in these the voice sounds were quite unnatural. The sounds might be characterized as low, forced, and strident. They were strikingly deficient in dental and labial qualities. The expiratory element of articulation showed conspicuous disorder. Only a very few attempts to speak have been made within the last few months, though the mental condition has been entirely natural, and the vocal chords have been examined‡ and found normal. In moderate laughter the voice sounds are nearly natural, though there is a distinctly unnatural quality in hearty laughter. The patient enjoys reading, but tires more readily than prior to her illness. With the exception of easily induced fatigue, the general health has been excellent for several months.

Just why efforts at speaking are not persisted in must be somewhat conjectural.§ It does not appear to me altogether improbable that, considering the highly nervous temperament of the patient, the very unsatisfactory results attending the early attempts may have brought about a condition essentially the same as that existing in hysterical aphonia or mutism.

---

* At the present writing all rigidity has disappeared, but there has been little, if any, further return of power.

† By Dr. W. H. Wilder.

‡ By Dr. T. Melville Hardie.

§ They have been much more frequent since the above was written, but the result is much the same as already described.

Inasmuch as the symptoms in this case are still receding and may have been caused by a vascular lesion—probably arterial thrombosis in the region of the red nucleus of the left side—its classification with the two preceding at this time must be merely provisional.

I may say in this place, by way of digression, that Reinhold[9] has reported a case where arterial thrombosis involving the medulla in the region of the lower olive resulted in hemiplegia of the opposite side of the body and pronounced ataxia on the same side.

These cases, from the clinical side, have much in common: a more or less severe, acute and probably infectious illness of varying duration and character, resulting in profound general muscular ataxia, showing itself conspicuously in the muscles concerned in articulate speech. In none has there been any lasting impairment of special sense or of general sensation. The ataxia has been essentially stationary; the general health has been excellent after the primary acute illness had subsided, and the mental condition normal. In Cases I. and II. the residual symptoms are very similar, indeed, almost identical throughout; while in Case III. there are remaining other prominent symptoms besides ataxia. That in this case other nervous tissues may have been injured besides those concerned in muscular co-ordination is not material to the purpose of this report. The essential question is, What part or parts of the normal adult brain have to be injured in order that general ataxia shall result?

Experiments on the lower animals, studies in embryology, clinical and post-mortem observations on the human subject, have abundantly demonstrated definite relations between the neurons of the cerebellum and those of other parts of the nervous system, both sensory and motor. Now, assuming that the cerebellum exercises a predominating influence upon the co-ordination of voluntary muscular movements, then it would not be unreasonable to assume in the cases cited that one effect of the primary disease had been to injure permanently those parts of the organ subserving this function, or, what would amount to the same thing, a considerable number of the neuron processes connecting it with other parts of the nervous system.

Except in the cerebellum or its peduncles those connecting fibres are so intimately related and intermingled with other structures that it is difficult to conceive of any acute pathological process that might severely injure or destroy them without also injuring the others, thus giving rise to other permanent symptoms.

And yet it is hardly more difficult to conceive that a toxin might limit itself, say to the cells of Clark's column, which are believed to send their processes to the cerebellum, forming the so-called direct cerebellar tract, thus connecting it with the sensory nervous system, than to understand why in certain cases only the bodies of the peripheral motor neurons should be attacked, as in anterior poliomyelitis.

The condition of the muscular system, especially in Cases I. and II., was very similar to that of one of the well-marked and advanced cases of hereditary ataxia in the series[13] reported by me several years ago. In Case XVIII. of that series the voice became strikingly like that observed in Cases I. and II. herein described before death (from exhaustion), which occurred in 1897, five years after my report.

If it is conceded that the influence of the cerebellum is paramount in controlling muscular co-ordination when the position and extent of the various tracts are remembered which connect it with other parts of the nervous system, it is not difficult to understand how far apart pathological processes may be situated, and yet, by destruction of one of these connecting paths, throw the cerebellum out of circuit, so to speak, and thus give rise to ataxia. In many cases of the progressive types of ataxia, as locomotor ataxia, and the so-called hereditary ataxias, the pathological process apparently begins and is for a long time confined to the spinal cord, while in the cases herein described it was apparently in the brain.

The mere clinical report of such cases as I have herein described is by itself of little value in helping to locate the centre or centres in the brain which control muscular co-ordination or the relation of these centres with other parts of the nervous system ; but if these cases could be brought to autopsy they might go a long way in that direction. My main purpose in describing them is founded in the hope that in the end, if enough similar cases are recognized, autopsies may be obtained which will render valuable contributions to a subject resting at the present time in considerable obscurity.

A not very exhaustive examination of available literature has revealed several reports of cases similar in some respects to those of mine. They have been variously designated cerebral ataxia, acute ataxia,[8] bulbar ataxia,[9] the symptom-complex of Friedrich's ataxia[11]—all following acute infectious diseases. In none, however, as far as I am aware, has the ataxia alone been of long standing, if indeed it had yet become stationary.

Doubtless a thorough inspection might reveal a considerable number of similar cases scattered throughout medical literature, but the trouble of searching records is very great, since as yet the cases have not been regularly classified.

Inasmuch as the anatomical basis of the ataxia in these cases is wholly conjectural, it is manifestly inconsistent to designate them by a term which would imply that this is understood. Generally, while it would doubtless be far more scientific to incorporate in the name of a disease a term that would give an indication of its anatomical basis, this, for obvious reasons, has been in the past and still is in many instances impossible, because a name embracing the salient features in the etiology and symptomatology becomes firmly established in medical literature long before the pathological anatomy can be determined. These are some of the considerations which have led me to suggest the above designation for these cases.

There is such a paucity of objective data bearing both upon the physiology of muscular co-ordination and the pathology of ataxia that I do not feel called upon at this time either to project an original hypothetical explanation of the ataxic phenomena herein set forth, or to repeat the speculations of others, which latter, in my opinion, have been far more ingenious and prolific than profitable.

[NOTE.—Since the above was written I have discovered that inadvertently and inexcusably I have overlooked a very excellent report of a case by Dr. Dinkler[15] quite similar in some respects to Cases I. and II. described above, though in Dr. Dinkler's case, which had lasted five years at the time of his report, there had been steady and marked improvement, so that finally the patient could walk without a cane, talk and writer fairly well, feed and dress himself. I fully agree with Dr. Dinkler, however, that his is a pure case, and I believe that the anatomical basis is essentially the same in all three. It is possible that in his case the short (four or five days) duration of the infectious process to which the ataxia was a sequel, may account in some measure for the steady progress toward recovery, the tissues concerned not having been as irreparably injured as in my cases. His case, too, was subjected to a very thorough course of gymnastic exercises, to which mine were not; but even allowing for that I think it probable that the injury was less severe.]

BIBLIOGRAPHY.

1. W. G. Spiller. Four Cases of Cerebellar Disease (one autopsy). Brain, 1896, part lxxvi.

2. Adolph Meyer and Sanger Brown. The Morbid Anatomy of a Case of Hereditary Ataxy. Brain, 1897, p. 276.

3. Campbell Thompson. Acute Ataxy of One Limb. Lancet, December 18, 1897.

4. Frankel. Die Ursachen der Ataxie bei der Tabes Dorsalis. Neurol. Centralbl., Aug. 1, 1897, W. 15.

5. Bruns (Hanover). Ueber einige besonders schwierige und praktisch wichtige, differential-diagnostiche Fragen in Bezug auf die Localisationen der Hirntumor.

6. William Knöpfelmacher. Zur Causistik der cerebellare Ataxie. Wiener med. Blätter, 1897, M. 22.

7. Herman Strauss. Ueber zwei gleichartige Fälle von rasch enstandener Ataxie mit Muskelsinnstörungen und Fehlen der patellar Reflexen. Charité-Annalen, 1896, Bd. xxi.

8. Henry J. Berkeley, M.D. Acute Ataxia following Diarrhœa. Bulletin of the Johns Hopkins Hospital, Baltimore, January and February, 1892, vol. iii., No 19.

9. Dr. H. Reinhold. Beiträge zur Pathologie der acuten Erweichungen des Pons und der Oblongata (Zugleich ein Beiträg zur Lehre von der "Bulbaren Ataxie"). Deutsch. Zeitschrift für Nervenheilkunde, 1894, vol. v.

10. An Unusual Case of Ataxia. British Medical Journal, 1895, p. 17.
11. E. Leyden. Ueber acute Ataxia. Zeitsch. für klin. Med., vol. xviii., 5 W. 6.
12. Dr. W. R. Gowers. Die Function des Kleinhirns. Neurolg. Centralbl., 1890, p. 194.
13. Sanger Brown. Hereditary Ataxy. Report of a Series of Twenty-two Cases. Brain, 1892, p. 250.
14. Alexander Katz. Das Symptomenbild der Friedreichschen Ataxie nach akuten Infectionskrankheit. Deutsch. med. Wochensch., No. 37, p. 587.
15. M. Dinkler. Ueber acute cerebrale Ataxie. Neurolg. Centralblatt, June 15, 1899.

ON THE SPINAL CORD CHANGES IN PARALYSIS AGITANS.

By Max Nonne, M.D.,
OF HAMBURG, GERMANY.

In the issue of The American Journal of the Medical Sciences for November, 1899, Dana has published an interesting paper on a case of paralysis agitans, of which he had occasion to make a thorough anatomical study. With the aid of Nissl's method, Dana found various changes in the large cells of the anterior horns. These changes consisted in "marked pigmentation of the cell-body, chromatolysis, loss and displacement of the nucleus, atrophy and loss of some of the dendrites." The cells of Clarke's columns were, however, found to be "fairly good." By the aid of the Marchi method he discovered a degeneration of the cells of the anterior horns, but in the case of the *white* matter this change was not to be found. The bloodvessels of the spinal cord were only slightly altered, and there was a very slight proliferation of the interstitial tissues. Dana remarks that these changes in the cells of the anterior horns have an important bearing upon the pathogenesis of paralysis agitans. In a note (page 8 of the reprint) Dana takes occasion to differ radically from an opinion which I have expressed.[1] It is Dana's opinion that in cases of paralysis agitans there is a functional invalidation of the ends of the dendrites of the nerve fibres leading from the cortical cells, where they join the motor cells of the anterior horns, and also a functional lesion of the motor spinal cells themselves. Secondly, that in cases which are already in an advanced stage an anatomical lesion could be positively demonstrated; and, thirdly, that the cause of the chief symptom of paralysis agitans (the tremor) could be traced in these disturbances to "the even flow of the motor impulses" from the brain to the spinal cord.

Dana remarks that I did not mention the various staining methods employed by me. I mentioned that I had stained with borax-carmine, according to Van Gieson's method, and with orcein. My purpose was to find whether or not there were any changes in the bloodvessels. I may also state that every senile cord and every case of paralysis agitans which have come under my notice were examined by the Nissl method, but I have *not* employed the Marchi stain in these cases.

---

[1] Deutsche Zeitschrift f. Nervenheilkunde, 1899, vol. xiv.

My reply to Dana is as follows: The changes which I found with the aid of the Nissl method were the same as those which he discovered; there was, moreover, no difference between the changes found in senile cords and those discovered in cases of paralysis agitans. The changes described by Dana are not different in any way from those which are usually found in a condition of cachexia. Such changes have often been described very minutely by German authors who do not consider them to be pathognomonic. This alteration of the ganglion-cells has not only been observed by me in my own cases of anæmia, but also in those cases of anæmia which have come under Goebel's[1] notice and which I have been permitted to examine. The fact that these changes in the ganglion-cells in cases of paralysis agitans often occur, and are not looked upon as being pathognomonic of paralysis agitans, has already been stated by Sander in his very first publication on the pathological anatomy of paralysis agitans.

The inferences to be drawn from Sander's studies are, firstly, that nearly all authors have observed proliferation of the neuroglia in the white substance of the spinal cord, as well as sclerotic changes in the arteries and smallest bloodvessels; secondly, that *the majority of the authors do not consider these changes to be in any way different from those which occur in the cases of senility*, and they, consequently, hesitate to state whether their findings have any significance with regard to paralysis agitans. Dana is certainly quite correct in stating that there is a difference between the ordinary senile tremor and that of old people suffering from paralysis agitans. It is my opinion, however, that these anatomical changes, because they occur in these two different illnesses (if I may be allowed to apply this term to the senile state), cannot possibly be the cause of the clinical phenomena.

I have never made use of the Marchi method in any of my cases. I will only mention the names of a few authors, namely, Hoche, Ursin, Kirchgaesser, Luce, Goebel and Nonne, from whose works it may be gathered that the Nissl granules in the ganglion-cells, unless developed to an unusual degree, are of as little importance as was the pigmentation of the ganglion-cells, of which so much was said when the older methods of staining were in use.

Sander is, in my opinion, quite correct in insisting that, since there is a proliferation of the neuroglia in nearly all cases of paralysis agitans—Dana's and Oppenheim's cases excepted—*Weigert's neuroglia stain should be used* in investigating them anatomically, and that the study of all cases, including Dana's and my own cases, in which this method has not been used, should be considered incomplete. There is all the more reason why we should make use of the above method, inasmuch as Sander discovered a very abnormal increase of the neuroglia, especially in the gray anterior horns. Here Sander comes to almost the same conclusion as Dana does, *i. e.*, that the gray substance forms an obstruction in the passage of the motor impulses from the brain to the spinal cord, the only difference being that Sander does *not* locate this obstruction in the *nerve cells*. Sander also states that this proliferation of the neuroglia in the anterior horns is not peculiar to paralysis agitans, but that it differs in a quantitative sense only from the proliferation of the neuroglia to be found in all cases of senility. Sander does not express himself very positively on the point, but invites further investigation with the Weigert-stain. This latter method he declares to be the only reliable one, inasmuch as all the other methods have been shown to be inadequate and defective.

---

[1] Mittheilungen aus den Hamburger Staats-Krankenanstalten, 1897.

THE PATHOLOGICAL ANATOMY OF THE CORD IN PARALYSIS AGITANS AND SENILITY.

BY CHARLES A. DANA, M.D.,
OF NEW YORK.

It does not seem to me that Dr. Nonne and I differ very much. He has simply interpreted my views rather too narrowly. These were as follows:

First. That paralysis agitans was a very strikingly distinct clinical entity and quite different from premature senility; hence, it was probable we should some time find its anatomical basis.

Second. That in my experience I did not find the pathological picture of the cords in paralysis agitans and senility identical.

I am very far from asserting that we have found all that is to be found or that it is now precisely known. I certainly never claimed that the changes in the anterior horn cells were pathognomonic. I may add here that the general statement that "German pathologists" have found the changes in the cords of the senile and in those of paralysis agitans identical is not necessarily convincing. A person may have very good technique and very little real intelligence. All pathologists have not found this identity.

Third. That there is a rather unusual degree of degeneration and vascular and sclerotic change in the anterior horns in paralysis agitans, and more here than in any other part of the central nervous system so far as yet known.

Fourth. My view that in the disease there is an interruption in the flow of nerve impulses from the cortico-spinal dendrites to the anterior horn cells is only a working hypothesis, but it is in harmony with pathological findings, as Nonne admits. I quite agree with Nonne as to the importance of neuroglia staining.

A CONTRIBUTION TO THE PATHOLOGY OF CHRONIC HYPERPLASTIC TUBERCULOSIS OF THE CÆCUM, BASED UPON THE STUDY OF TWO CASES, IN ONE OF WHICH CARCINOMA OF THE CÆCUM COEXISTED.

By T. R. Crowder, M.D.,
FELLOW IN PATHOLOGY, RUSH MEDICAL COLLEGE.

(*From the Pathological Laboratory of Rush Medical College, Chicago.*)

I.

As early as 1835 a case of tuberculosis of the cæcum is recorded by A. Dupin. Valy, in 1843, and Bodard, in 1844, recorded cases of tuberculous typhlitis, and Leudet, in 1859, basing his conclusions upon extensive investigations, placed the so-called "typhlitis stercoralis" in the class of tuberculous affections of the cæcum. In these earlier reports, however, no particular distinction is drawn between acute and chronic or between localized and progressive forms of tuberculosis of the intestinal tract.

On account of its usual association with tuberculosis of the lung so extensive as to contraindicate operative procedures, its rapidly spreading character and its frequent extensiveness before clinically recognized, intestinal tuberculosis belongs chiefly in the field of internal medicine. The great development in the application of surgical treatment to all sorts of localized intestinal lesions during the last decade and the progress in surgical pathology have, however, called attention to a form of circumscribed long localized tuberculosis of the bowel which may be successfully treated by operative procedures. This hyperplastic form of tuberculosis has its counterpart in certain cases described in which the disease has been located in the skin, larynx, and joints and certain cases of so-called Hodgkin's disease, which have proven post-mortem to be of a tuberculous nature, but to have given rise to fibrous hyperplasia rather than to caseation and destruction of tissue. The condition is characterized pathologically by a great thickening of the bowel wall and a narrowing of its lumen. The hyperplasia of the coats of the intestine often gives rise clinically to a tumor formation resembling a carcinoma.

This form of intestinal tuberculosis is met with most frequently in the region of the cæcum. According to Conrath[1] its pathological anatomy was first described by Durante at the Seventh Italian Surgical Congress at Florence in 1890. At a meeting of the Gesellschaft der Wiener Aerzte, in 1891, Billroth[2] demonstrated a resected cæcum which had presented itself clinically as a large, hard swelling in the right iliac region, in every respect resembling a carcinoma. He called attention to the clinical similarity of the two conditions and to the difficulty of making a differential diagnosis even when the tumor is removed and subjected to a careful macroscopical examination. He expressed the opinion at that time that tuberculosis did not always result in destruction of tissue, and that the epithelioid cells may become fibrous, resulting in the formation of a firm tumor.

Hartman and Pilliet[3] before La Société Anatomique de Paris, in 1891, called attention to a form of tuberculous typhlitis which accurately resembles a carcinoma and which is not to be distinguished from it by the naked eye. They also expressed the opinion that a large number of cases published as carcinoma and lymphosarcoma were in reality tuberculous affections of this nature.

In 1892, Sachs[4] was able to collect twelve cases from the literature, to which he added a very typical one successfully operated upon by himself. In this case there was a tumor the size of an orange located in the cæcal wall and almost obliterating the bowel lumen. There was no caseation of the retrocæcal lymphatic glands, and no ulceration of the intestinal mucosa. The tumor was nodular and uneven, and was considered carcinomatous until the microscopical examination revealed its true nature.

Presenting a case before La Société Anatomique de Paris in 1894, Pilliet and Thierry[5] characterized chronic tuberculosis of the cæcum by three things: 1. Anatomico-pathological; there is a great thickening of the wall of the cæcum in the region invaded, and especially of the mucosa, which at the borders of the ulcers mounts into knob-like outgrowths. 2. Clinical, and depending upon the first; the formation of a tumor. 3. Therapeutic; it remains long localized, and all the part of the intestine invaded may be resected with success, thus benefiting the patient for a longer or shorter time.

Further contributions to the literature of the subject have been made by Czerney,[1] Salzer,[2] Hofmeister,[3] König,[4] Courtillier,[5] Benoit,[6] Conrath,[7] Caussade and Charrier[8] and others. Perhaps the most thorough review of the subject in all its relations, and especially from the surgical stand-point, is the article by Conrath. He was able to collect from the literature, personal communications, and his own experience a total of eighty-five cases undergoing surgical treatment, with a mortality of 16.7 per cent.

---

[1] Conrath. Ueber die lokale chronische Cæcumtuberculose und ihre chirurgische Behandlung. Beiträge zur klinischen Chirurgie, 1898, Bd. xxi.

[2] Billroth. Wiener medicinische Presse, 1891.

[3] Hartman et Pilliet. Bull. Soc. Anat. de Paris, 1891.

[4] Sachs. Ein Beitrag zur Extirpation des Blinddarms wegen Tuberculose. Archiv für klin. Chir., 1892, Bd. xlii.

[5] Pilliet et Thierry. Contribution a l'Étude de la tuberculose locale du cæcum. Le Progrès Médicale, 1894, Tome xx.

Development of a knowledge of the subject is largely due to the efforts of the French and German surgeons. It is a noteworthy fact that Conrath, in his collection of eighty-five cases in 1898, cites but one from the American medical literature, that one by Dr. Beck,[9] of Chicago. From the literature of this country I have been able to add but two cases to this number, these by Dr. Ochsner[10] and Dr. Senn,[11] of Chicago. All three of these have been presented in a more or less extensive group of cases reported from a surgical point of view without summary of the general pathology of the condition.

In the literature of England I have found but two cases. They are reported by Page[12] and by Lediard.[13] The case by Page is stated not to be definitely tuberculous, but to show a high degree of chronic inflammation of the cæcum with hypertrophy of its wall and caseation of the retrocæcal lymphatic glands with the microscopical findings of tuberculosis.

That this form of cæcum tuberculosis is sufficiently rare or sufficiently unrecognized to be deserving of further comment is shown by the fact that no direct reference is made to it in the text-books on pathology by Orth,[14] Ziegler,[15] and Birch-Hirschfeld,[16] and is no more than mentioned by König[1] in the latest edition of his text-book of surgery, where he gives a brief summary of the article by Conrath.[2]

---

[1] Czerney. Beiträge zur klinischen Chirurgie, Bd. vi., ix. u. xvii.

[2] Salzer. Beiträge zur Pathologie und chirurgischen Therapie chronischen Cäcumerkrankungen. Archiv für klinische Chirurgie, 1892, Bd. xliii.

[3] Hofmeister. Beiträge zur klinischen Chirurgie, Bd. xvii.

[4] König. Die stricturirunde Tuberculose des Darms und ihre Behandlung. Deutsche Zeitschrift für Chirurgie, Bd. xxxiv.

[5] Courtillier. Tuberculose chronique de l'angle ileo-cæcale. Bull. de la Soc. Anat. de Paris, 1896, No. 13.

[6] Benoit. Tuberculose locale chronique de la region ileo-cæcale. Thèse, Paris, 1893. Abstract in Ergebnisse der Allgemeinen Pathologie. Lubarsch-Ostertag, 1895, Bd. ii., S. 337. Also, Tuberculose ileo-cæcale chronique. Gazette des Hôpitaux, 1898, pp. 357, 385.

[7] Conrath. Loc. cit.

[8] Caussade et Charrier. Un cas de tuberculose ileo-cæcale a form hypertrophique avec considerations clinique, anatomique et therapeutique. Arch. Générales de Médecine, 1899, N. S., Tome i., No. 4.

[9] Beck. S. Magill. Resection of the Ileocæcal Coil of Intestine. Annals of Surgery, 1894, vol. xx. p. 672.

[10] Ochsner. Report of Cases of Resection of the Cæcum. Chicago Medical Recorder, 1895, vol. ix. p. 113.

[11] Senn. The Surgical Treatment of Intestinal Tuberculosis. Journ. Amer. Med. Assoc., 1898, vol. xxx. No. 21.

[12] Page. The Lancet, 1897, vol. ii. p. 10.

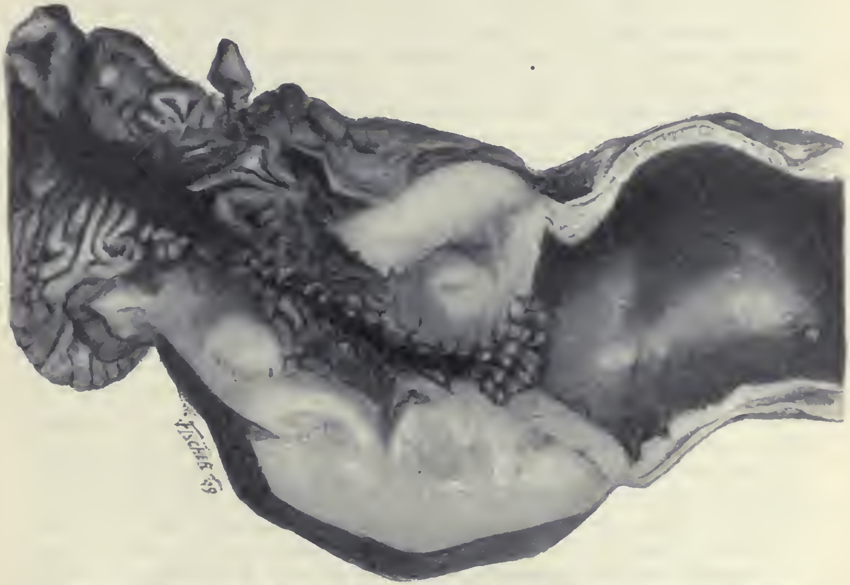
[13] Lediard. The Lancet, 1898, p. 408.

[14] Orth. Lehrbuch der speciel en path. Anat., 1887.

[15] A Text-book on Special Pathological Anatomy, 1897. Translation of eighth German edition.

[16] Birch-Hirschfeld. Lehrbuch der speciellen path. Anat., 1894.

CASE I.[3] *Tumor-like tuberculosis of cæcum; resection; end-to-end anastomosis; recovery.—History.* A colored schoolgirl, aged fourteen years, was admitted to Cook County Hospital, August 15, 1898, and assigned to the service of Dr. E. L. Morehead. The following history was obtained upon admission: Comes of healthy parents. Father living and well; mother died in childbirth. It is said that she did not have phthisis. No specific history in either parent. One maternal uncle has scrofula and one maternal aunt died of pulmonary tuberculosis. A brother died at nine months and a sister at four years of acute diseases, and a brother died at seven years of "quick consumption." No brothers or sisters living. The patient has had the ordinary acute diseases of childhood, but has been otherwise always well. Has never menstruated.



Cæcum of Case I. Opened along the anterior surface and a wedge-shaped piece excised from the tumor mass.

The present trouble began about eight months ago, with cramp-like pains in the abdomen. These were of a recurrent and somewhat periodic nature, at first slight and infrequent, gradually increasing in frequency and severity. They were at first diffuse, but always referred themselves ultimately to the right iliac region. They would last ten or fifteen minutes, repeating themselves several times during each attack at varying intervals of some minutes. During the latter part of last winter they were frequently accompanied by vomiting, and came on three or four times a week to once or more daily. For the past three or four months visible, local, transitory swellings, accompanied by rumbling, have been noticed by the patient in the abdomen, coming on and disappearing with the pains. During the past two weeks the pain has been almost constant, always being ultimately referred to the right iliac region and accompanied by much vomiting. Bowels regular at all times, but appetite very poor. Only liquid food can be retained. Has lost much flesh.

---

[1] König. Handbuch der specielle Chirurgie, Siebente Auflage, 1898, Bd. ii., S. 330.

[2] Conrath. Loc. cit.

[3] A brief clinical history of this case was published with others by Dr. E. L Morehead in the Chicago Clinic, January, 1899, under an article entitled "Intestinal Obstruction."

Examination. General nourishment poor; skin smooth and moist; eyes negative; tongue lightly coated; mucous membranes anæmic; teeth well formed and regular. The chest is fairly well developed, and respiratory movements free. The heart and lungs are negative. On inspection the abdomen shows localized distention of intestinal coils, which change position as peristalsis proceeds. This action is easily palpable, and gurgling, rushing sounds accompany it. There is tenderness over the whole lower abdomen, most marked in the right iliac region, with point of greatest tenderness half-way between the umbilicus and the anterior superior spine of the ilium. Lying deep in the abdomen, upward and outward from this point is a firm, tender, smooth mass the size of a large lemon. This can be fairly well outlined by the fingers, is very slightly movable, is not affected by deep inspiration, and is apparently free from the anterior abdominal wall. No lobulation or other unevenness of the surface can be made out. The external genitalia are negative; hymen intact and no vaginal examination made. The inguinal, axillary, cervical, and epitrochlear lymph glands are palpable but not large. Pulse 88, strong and regular; temperature 100° F.; respiration 24. Urine: Specific gravity 1032; reaction acid; no albumin or sugar.

Operation. The patient was operated on the morning after admission, under chloroform anæsthesia. An incision three and one-half inches long was made in the direction of the fibres of the external oblique and bisecting a line joining the umbilicus and the right anterior superior spine. No adhesions were found to the anterior abdominal wall. Abdominal exploration reveals a firm mass, as described in the external examination, occupying the ileocæcal region. It is but slightly movable, and is brought forward into the wound with considerable difficulty after loosening firm adhesions posteriorly. It is found to be a slightly lobulated tumor mass involving the entire circumference of the bowel at the ileocæcal junction. The lower ileum is dilated and the walls are thickened and somewhat indurated. The peritoneum is free from adhesions, and is for the most part smooth, but for a distance of about an inch above the tumor shows a number of slightly roughened and depressed round and oval spots of a yellowish-white color, measuring in diameter from 1 to 5 millimetres. The lymphatic glands lying in the mesentery next to the cæcum are firm, white, and considerably swollen. No vermiform appendix is recognized. A strong fibrous band passes from the caput cæci to the pelvic fascia at the pelvic brim, and by traction exposes the right tube and ovary. This is ligated with catgut and divided. It is a solid fibrous cord without a lumen. The tumor mass, including about two inches of bowel on each side, was excised as rapidly as possible—the patient's general condition becoming very poor—and, the colon and ileum being practically the same size, an end-to-end anastomosis was made by a single row of Lembert sutures of fine silk. The parts were carefully dried, hæmostasis assured, and the bowel dropped back into the abdomen. A drain consisting of several strands of iodoform gauze was passed down to the sutured bowel ends, and the external wound closed by a single row of silkworm-gut sutures, embracing the whole thickness of the abdominal wall. The upper one of these, where the drain emerged, was left untied. About 600 c.cm. of normal salt solution were injected slowly under the pectoralis major muscle during the latter part of the operation. The patient left the table with a very weak pulse of 156, respiration of 16, and a warm, dry skin. Nothing was allowed the patient by mouth except occasional teaspoonfuls of warm water during the first four days, water and liquid foods with whiskey being administered by the rectum. She suffered very little from thirst or other discomforts, and, aside from a rise of temperature to 102.4° F. late on the day of operation, made an uneventful and perfect recovery. The large drain was removed on the second day, and a small strand of iodoform gauze inserted just through the abdominal wall. This was left undisturbed until the fifth day, when it was removed and the remaining suture tied. The wound healed throughout without suppuration. At the end of three weeks the patient left her bed, and after another week left the hospital, much improved in general health and flesh and without pain or discomfort in the abdomen. Seen during the latter part of December, 1898, she had gained greatly in flesh and no evidence of tuberculosis could be found in the lungs or elsewhere upon careful physical examination.

Pathological Examination. The growth is situated in the wall of the cæcum and involves its entire circumference. It begins above at what appears to be the ileocæcal junction, and involves about three inches of the length of the bowel, this distance being somewhat less on the mesenteric side. The surface is indistinctly lobulated and shows torn adhesions posteriorly. The wall is firm and resisting to the knife, whitish on the cut surface, with irregular yellowish areas, and measures in thickness from 1 to 2.5 c.m. The thickest part of the wall, which lies opposite the mesenteric attachment, shows in the centre and just beneath the mucosa several pea-sized somewhat softened areas, from which can be turned out firmer masses which lie loosely adherent and which appear to be necrotic. The original contour of the cæcum is lost. It is as if the ileum and colon were joined end-to-end and a new growth occupied the wall at their junction. The lumen of the bowel included in the growth is somewhat funnel-shaped with the apex toward the ileum, where it is scarcely as large as an ordinary lead-pencil. The mucous membrane is covered with thickly-set little polypi of an average size of large wheat grains, some of which are sessile and some have short pedicles. Some of them have branched extremities. These serve almost to entirely obliterate the remaining lumen. There is at no place any visible loss of mucous membrane. The lower ileum is nearly 5 c.m. in diameter with greatly thickened muscular walls, measuring 4 mm. in places and very firm and inelastic. Situated in it are yellowish areas of firm, fatty tissue. The mucous membrane is smooth and free from folds, but is congested and shows a few ecchymotic areas. The serous coat also shows a few ecchymotic areas and the roughened spots before described. At a point on the mucous membrane of the ileum exactly opposite the mesenteric attachment and about 5 c m. above the tumor is a polypoid growth the size of a small pea, slightly flattened, resting on a short pedicle resembling the polypi in the cæcum. The wall and the mucous membrane of the colon beyond the growth are free from changes. Lying within the excised mesentery are four lymphatic glands the size of large hazelnuts, of moderate firmness, smooth and clear white on the cut surface. They show no areas of caseation or of softening.

Microscopical Examination. The greater part of the tumor is made up of a hypertrophied muscular wall showing a great increase in both the fibrous and muscular elements and containing more connective-tissue cells than normal. The yellowish areas are ordinary adipose. There are many typical microscopic tubercles, which are so closely grouped in some places that as many as ten may be seen in a single field (Zeiss obj. AA and oc. 3). They are most numerous in the submucous tissue, in places lying just at the basement membrane, but are of very irregular arrangement and not seen in typical form in all sections. The whole of the submucous tissue is densely infiltrated with deeply staining small round cells. Tubercles are found in the muscular coat in only a few places, where a large confluent mass lies deeply embedded in its centre. The papillomatous mucous membrane shows great hyperplasia of the glandular elements after the manner of a benign papilloma, with dense round-celled infiltration of the stroma. The epithelial cells are large, cylindrical, and show all stages of mucoid degeneration. Over some small areas the epithelial covering is entirely lost and its place taken by an avascular granulation tissue. The epithelial tissue does not end abruptly where this granulation surface begins, but shades gradually into it without any depression or unevenness. Glandular elements are found in places situated rather deeply in the wall, but everywhere maintain a typical structure. Many of the gland lumina are greatly distended. Sections taken in proper directions through the part containing what were described as free bodies show them to be large, buried papillæ containing but a mere remnant of epithelial covering, lying within cavities showing likewise a mere remnant of epithelial lining, as if a large papilla during the process of its development had been bound to the serosa, and the muscular and submucous tissue at its base had not undergone the general hyperplasia of that surrounding it. At the attached base of these papillæ is where is found the greatest infiltration of the deeper parts of the wall with tubercles. The more actively proliferating tissue surrounding them has entirely closed over them on the side toward the lumen, thus burying them completely. They show a central necrosis surrounded by an almost avascular granulation tissue containing giant-cells. The fold of mucosa and submucosa surrounding them shows a dense round-celled infiltration and contains an occasional giant-cell.

The lymphatic glands of the mesentery contain a large number of microscopic tubercles in every way typical. Some of them show a beginning necrosis in the centre, but at no place is there found complete necrosis with caseation. These tubercles lie singly and in large confluent groups.

It was only after a long and painstaking search that tubercle bacilli were demonstrated either in the lymphatic glands or in the tissue of the cæcum. Never were there found more than two bacilli in a single field, and this was noted but twice—once in the glands and once in the cæcal wall. Since those found were of very typical form and appearance, it is safe to conclude that the comparatively negative results of the search were due to scarcity of the organisms.

From the absence of symptoms and physical findings pointing to localized tuberculosis in other parts of the body, it would seem that this case is one of primary localized tuberculosis of the bowel. As is well known to medical clinicians, however, it is quite possible to have a slight apical involvement of the lung which may at certain times present no findings even upon the most careful physical examination. Especially is this true of small healed tuberculous foci in whatever part of the lung. From the comparative infrequency of primary tuberculosis of the bowel, which will be shown by statistics cited later, it is perhaps unsafe to conclude that this case is such a one, though the clinical findings speak strongly in favor of it.

The second case of hyperplastic cæcum tuberculosis which has come under my observation is an unoperated one in which the disease was combined with carcinoma of the same organ. But one similar case has been noted in the literature at my disposal. That one is recorded by Salzer[1] in the surgical reports of diseases of the cæcum from Billroth's clinic.

CASE II. *Tuberculosis and carcinoma of the cæcum; inguinal fistula; death.*—Mrs. D., aged fifty-four years, entered the Presbyterian Hospital, July 24, 1897, and was assigned to the service of Dr. N. Senn. On account of a misplacement of the hospital record only the following very brief abstract of the clinical history can be given. For this and the post-mortem report I take pleasure in expressing my thanks to Dr. J. D. Freeman.

There was no history of tuberculosis or malignant tumors in any member of the family. Three years before entrance to the hospital tumors were removed from the left breast and left axilla, but there is no definite knowledge of their nature. The patient gave a history of a fall, receiving a blow in the right inguinal region. Succeeding this there was pain upon walking, which radiated down the leg. Later there appeared a swelling in the right groin, which was incised, revealing an abscess. There remained to the time of death a fistula in the right groin, which at times had permitted the escape of fecal matter. Repeated examinations of the pus from the fistula failed to show any actinomycelial granules. The patient died July 30, 1898.

Post-mortem Examination. Anatomical diagnosis: right inguinal fistula communicating with the cæcum; chronic tuberculosis of lungs and peribronchial lymph glands; amyloid spleen; chronic interstitial nephritis; carcinoma of the cæcum associated with tuberculosis.

The body is that of an emaciated old woman; rigor mortis slight. In the right inguinal region above the middle of Poupart's ligament are two sloughing fistulous openings from which escape, upon slight pressure, a thick, greenish-yellow purulent material.

---

[1] Salzer. Beiträge zur Pathologie und chirurgischen Therapie chronischer Cæcumerkrankungen. Fall 19. Arch. f. klin. Chir., 1892, Bd. xliii., S. 101.

The peritoneal cavity is empty and the peritoneum is smooth. The head of the cæcum is bound firmly in the right iliac fossa by strong fibrous adhesions. The appendix is not recognized.

The pleural and pericardial cavities show no changes.

The heart is contracted. There is a " soldier spot " on the anterior surface of the apex. The pulmonary and aortic valves are competent to the water test. The cavities of the heart contain clotted blood. The endocardium is smooth and the valves show no changes. The myocardium is soft, of yellowish-red color, and has a greasy feel. The coronary arteries and the aorta show no changes.

The lungs are bluish in color and show a marginal emphysema. They crepitate throughout and float In the centre of the middle lobe of the right lung is a firm pea-sized nodule with a calcareous centre. The apices are free from changes. The peribronchial lymph glands are black upon the cut surface and have calcareous nodules in them.

The spleen is larger than normal and of firm consistence. The capsule is smooth and tense. It cuts with increased resistance. The pulp is firm and pale red. Everywhere on the surface are pin-point sized, translucent, slightly elevated, grayish areas.

There are two small cysts on the convexity of the left kidney. The capsule strips reluctantly, bringing away parts of the parenchyma and leaving a rough granular surface. Many small, irregular, yellowish, depressed scars are seen on the surface. On section the cut surface is pale. The cortex is to the medulla as 1 to 2½. The cortical markings are invisible. The pelvis of the right kidney is dilated.

The liver is smooth externally. The substance is soft. Cut surface is yellowish and feels greasy. The lobular markings are invisible. The gall-bladder is negative.

The stomach and small intestines are negative.

A soft catheter passed down through the right inguinal fistula appears in the cæcum. Between the external opening and the opening into the cæcum lies a cavity half the size of the fist and half filled by a fleshy-looking mass. The cæcum forms part of the wall of this cavity, and projecting into the lumen of the head of this cæcum is a large cauliflower-like mass. The anterior cæcal wall is thick, firm, and apparently fibrous. The remainder of the large intestine shows no changes.

The pelvic organs and pancreas show no changes.

Macroscopical examination of the cæcum after hardening for several weeks in Müller's fluid and alcohol

The mass is about the size of the fist or slightly larger. The anterior surface of the cæcum presents a defect in the wall about 2 cm. in diameter, this defect being largely closed in by a soft, projecting tumor mass having a finely papilliform surface The cæcal wall adjoining this defect is 1 to 2 cm. in thickness and is firm and indurated. That side of the border of the defect lying toward the ileum is free from the papillary outgrowth and has a roughened internal surface. Section shows this thickening to extend along the anterior cæcal wall for a distance of about 5 cm. to where it joins the small intestine, and to extend backward over the caput coli to the posterior wall, which is not more than the usual thickness. Upon multiple sections of this wall on the side of the opening toward the small intestine it is seen to be composed largely of firm fibrous or fibromuscular tissue, and to contain one very large bloodvessel with a greatly thickened wall. There is also noted a somewhat crescent shaped area in the centre of each section, which is made up of a clear translucent substance presenting a glistening surface.

Upon cutting open the cæcum longitudinally it is found to be practically filled by a cauliflower mass springing from the margins of the above-noted defect in the anterior wall and from the inner surface of the thickened wall lying posterior to that defect. The peripheral terminations of this papillary growth are fine and filamentous. Upon it are found a few firm, smooth, oval polypi the size of large wheat grains, and resting upon fine filamentous pedicles up to 1 cm. in length. The inner surface of the indurated and thickened portion of the anterior wall lying toward the ileum presents none of the papillary outgrowth, and is apparently devoid of mucous membrane. It presents the appearance of shallow ulceration. The remaining mucosa and the wall of the cæcum and of the adjoining bowel segments are free from visible changes. In two places the growth penetrates the posterior cæcal wall and appears externally with the same general characteristics. Section through one of the large papillary masses shows a branching, tree-like arrangement of connective tissue covered by what resembles a thickened mucous membrane. No connective tissue is visible in the finer terminal filaments. The remainder of this tissue is firm and fibrous, with smaller and larger areas of yellowish fat. In sections of the wall posterior to the defect are noted a similar increase in firm connective tissue, enclosing, however, larger and smaller masses of translucent gelatinous material.

Microscopical Examination. Sections through the tumor mass show it to be made up of a rich-celled branching connective tissue framework bearing a thick layer of tubular epithelial structures. The tubes run in various directions and are in places coiled and bent upon themselves. The line of junction of the epithelial and connective tissue portions of the mass is sharply defined, and the tubules do not penetrate into the deeper framework of the tumor. It has the appearance of a benign papillomatous proliferation of the mucous membrane. The epithelial cells are large and cylindrical, contain large oval nuclei near their basal attachments, and show but a single layer to each tubule. Many of the glands are cystic. They show all stages of mucoid degeneration, and some superficial necrosis with disappearance of the nuclei. In places the mucoid material only fills the lumen of the tubule, the cells being free from it. This change is more noticeable in the deeper parts of the epithelial structure.

Sections of the thickened wall behind the defect in the cæcum show toward the inner surface, at the base of the cauliflower-like mass, this same epithelial proliferation with extensive mucoid changes. The epithelial cells are here seen to penetrate to all depths of the tissue as discrete tubules, small masses of tubules or as tubules without visible openings, forming strands of atypical epithelial cells. This formation even penetrates the entire thickness of the wall, and shows masses of atypical tubules externally. In most of this formation the mucoid change is far advanced, resulting in partial or complete destruction of the protoplasm of the cells. There are found also large irregular areas of stringy, mucoid material into which project connective tissue strands, radiating from which is often a very definite penniform marking made by strands of mucoid of different densities. Following the line of this marking are occasionally seen rows of epithelial cells in an advanced stage of degeneration. These areas correspond to the gelatinous masses noted in the gross specimen. There is found also great hyperplasia of the fibrous elements of the wall and large areas of adipose tissue. In the stroma are a few small nodules of lymphadenoid tissue. Throughout the wall are scattered small areas of round-celled infiltration, and at the border of the defect in the wall a superficial necrosis and diffuse round-celled infiltration.

Sections taken from the wall on that side of the defect toward the ileum, where, in the macroscopical examination, none of the tumor growth was found, present in some respects a strikingly different picture. There is the same connective tissue hyperplasia, which is here even more marked; there are small areas of mucoid material and areas of fat. The inner surface is made up of granulation tissue with superficial necrosis. Embedded in this granulation tissue are a large number of giant-cells, some of which have a definite peripheral arrangement of the nuclei and are surrounded by cells of ovoid and elongated shapes staining distinctly paler than the surrounding denser round-celled granulation tissue. Deeper in the tissue are small round-celled areas, but no giant-cells are found among them. In certain parts of the wall are found different sized groups of large oval or polygonal cells formed into a distinct alveolar arrangement by a delicate connective tissue stroma, the alveolar spaces containing one to ten cells each. From their size, shape, arrangement, and staining properties these would seem to be atypical epithelial cells, but they do not otherwise resemble the carcinoma cell nests found in other parts, and show no mucoid changes.

There is a considerable thickening of the walls of all the bloodvessels. In a mass of lymphadenoid tissue lying at the side of a large vessel there are noticed clear hyalin-looking areas and wide hyalin zones lying just outside the endothelial lining of the small bloodvessels. These areas and zones stain purple with iodine green, and are interpreted as amyloid.

In the enlarged retrocæcal lymph glands are found several typical tubercles with central giant-cell and a zone of pale epithelioid cells surrounded by densely packed small round cells. There is no necrosis except in the central part of the giant-cells and no resemblance to caseation is noted. Amyloid material is present here also, as small areas and zones in the capillary vessel walls. In the tubercles of these glands are found a very few tubercle bacilli. The search for tubercle bacilli in the base of the ulcer of the cæcum and in the lymphoid areas of the cæcal wall was negative.

We have not here the classical picture of hyperplastic cæcum tuberculosis set forth in the first case, yet it seems plain from the great overgrowth of connective and muscular tissue in the wall—measuring 2 cm. in thickness—that the case belongs to the same class. From the few facts in the clinical history it seems more than probable that this case is one of perforating tuberculosis of the cæcum secondarily invaded by carcinoma. The fact that the inguinal fistula was of so long standing speaks strongly for such a sequence. Further evidence is found in the macroscopical findings in that the malignant growth takes its origin from the margin of an old tuberculous ulcer. Though tubercle bacilli were not found in the base of this ulcer itself, it seems clear from the histological findings in the wall of the cæcum and the presence of tubercles and tubercle bacilli in the adjacent lymphatic glands that the lesion must be of such an origin. There is a well-marked extension of the tuberculous process to the regional lymphatic glands, while the malignant growth remains localized in the cæcal wall. In the lungs and peribronchial lymphatic glands there are found healed tuberculous foci which may have given rise to the development of the primary disease of the cæcum.

II. Pathological Anatomy.

As used in reference to the condition here considered, the word tumor has only a clinical significance. However great the swelling may be, it is essentially a hyperplasia; whatever may be its macroscopical resemblance to carcinoma or other true tumors, it is distinctly an inflammatory swelling which Benoit[1] has termed " pseudo-neoplasm."

This hyperplastic form of tuberculosis as found in the intestines is usually located in the cæcum, and most often takes its origin at the ileocæcal junction. A case was operated upon by Esmarch[2] in which there was in addition a similar tuberculous tumor in the ileum producing stenosis 35 cm. above the ileocæcal valve. Sachs[3] calls attention to a similar tumor of the ileum in the practice of Kocher.

In the beginning the tumors are small and sharply outlined from the adjoining portions of the bowel. They are usually rough and nodular, and may reach the size of a large orange. In the case reported by Sachs[4] the mass was 10 to 12 cm. in diameter. They lie above the brim of the true pelvis in the right iliac region, and may be slightly movable or firmly fixed. Fibrous adhesions are usually found binding the cæcal tumor posteriorly, and it may be adherent to loops of intestine, the abdominal wall, and other surrounding structures. Koerte[5] was compelled to abandon radical operation on account of the bad local condition. The wall of the cæcum is firm and unyielding, resistant to the knife, whitish on the cut surface, and is irregularly contracted by cicatrices. It measures in thickness from 0.5 to 3 cm., and often contains areas of firm, fatty tissue. This thickening is, as a rule, confined to the cæcum and its immediate neighborhood, the mass measuring little more in a direction parallel to the bowel than in its transverse diameter. In the case of Pilliet and Thierry[6] the change in the intestinal wall extended even as far as the sigmoid flexure. While such a condition is to be looked upon as a decided exception, it is to be noted that the lesions have little tendency to extend to the ileum, but more to continue up the large bowel, the wall being frequently thick and hard for a distance of several inches. The thickening is due to a hyperplasia of the fibrous and muscular tissues, and the inelastic firmness to infiltration with tuberculous granulation tissue.

---

[1] Benoit. Gaz. des Hôpitaux, 1898.

[2] Esmarch. Quoted by Hofmeister. Ueber multiple Darmstenosen tuberculösen Ursprungs. Beiträge z. klin. Chir., Bd. xvii.

[3] Sachs. Loc. cit.

[4] Sachs. Loc. cit.

[5] Koerte. Deutsche Zeitschrift für Chirurgie, Bd. xl., S. 562.

[6] Pilliet et Thierry. Loc. cit.

With but a single exception[1] in the recorded cases there has been more or less marked stricture at or near the position of the ileocæcal valve. The stricture may be annular, canalicular or funnel-shaped, and is usually sufficiently marked that chronic intestinal obstruction is one of the clinical features of the case. The degree of constriction is sometimes excessive. In a case reported by Becker[2] water found its way through the narrowed lumen only in drops. In one of Czerney's[3] cases the narrowed lumen was divided in two equal parts by a fibrocellular band, left in the ulcerative process at the ileocæcal valve. The narrowing may be caused by cicatricial contraction in the healing of old tuberculous ulcers, but also by hyperplasia of the intestinal tunics and the formation of numerous polypoid outgrowths of the mucosa. The point of greatest constriction is usually at the ileocæcal valve, which is thickened, stiff, cicatricial, or often unrecognizable. Associated with the stricture at the location of the tumor it is not infrequent to find cicatricial stenosis in other parts of the bowel. Frank[4] found such a condition in both the ileum and the ascending colon. Czerney[5] found at a distance of two meters above the valve a constriction from a healed tuberculous ulcer associated with tubercles on the peritoneum. Conrath[6] found stricture outside of the cæcum in seven out of eighty-one cases. From the resistance to the progress of intestinal contents caused by the stricture there occurs a compensatory hypertrophy of the lower ileum, often associated with considerable dilatation of the lumen and induration of the wall. That the hyperplasia in the wall of the cæcum itself is not brought about by constriction—that it is not a compensatory hypertrophy—is shown by the case of Caussade and Charrier,[7] in which the cæcum was dilated and there was no stricture at any point. The cæcal wall showed great hyperplasia, as do cases with stricture, which was eccentrically developed.

Early in the disease the mucosa may be little changed. It is usually the seat of larger or smaller ulcers, with undermined edges and a floor beset with minute grayish tubercles. These may involve a large part of the colon and lower ileum, as in cases of Pilliet and Thierry[1] and Czerney.[2] They may be serpigenous, even leaving islands of intact mucous membrane, as in ordinary destructive tuberculous affections.

---

[1] Caussade et Charrier. Loc. cit.

[2] Becker. Ueber Darmresectionen. Deutsche Zeitschrift f. Chir., 1894, Bd. xxxix., Fall 31.

[3] Schiller. Ueber die Darmoperationen an der Heidelberger chirurgischer Klinik. Beiträge z. klin. Chir., Bd. xvii., S. 603, Fall 9.

[4] Frank. Wiener klin. Woch., 1892, S. 390.

[5] Schiller. Loc. cit. Case 9.

[6] Conrath. Loc. cit.

[7] Caussade et Charrier. Loc. cit.

In certain instances, however, a mucosa appearing entirely intact to the naked eye has been found in a relatively far advanced case of chronic cæcum tuberculosis. Such are the cases reported by Sachs,[3] Hofmokl,[4] Goschel,[5] and Case I. reported in this paper. The mucosa is much thickened and beset with little papillomatous masses of variable size, which constitute one of the striking and almost constant features of the gross pathology of the condition. They are largest and most numerous at the margins of the ulcers, where they may reach the size of hazelnuts.[6] On the other hand, they may be fine and filiform. As in the cases reported here, they may be set upon long, slim pedicles, or by some accident of development buried in the wall, conditions which I have not found described in the literature. The papillæ are present also, and in typical form, in those cases not showing ulceration. Caussade and Charrier[7] describe a case in which the hypertrophied mucosa was simply thrown into numerous transverse folds which were in places branched or broken into segments. In a case from Czerney's[8] clinic a 2 cm. broad ring of cauliflower mass, which was ulcerated, soft, and hemorrhagic, grew into the lumen. Following this was a 5 cm. broad cicatrix, and following the cicatrix 9 cm. of ulcerated surface.

The vermiform appendix is usually found not greatly involved. In general it resists well, though usually embedded in adhesions. The lumen usually opens freely into the cæcum. Hartman[9] reports a case in which it was greatly dilated and the lumen occluded. The submucosa is usually to some extent hyperplastic. In a case by Thierry and Routier[10] the appendix had undergone changes similar to those of the cæcum.

Tuberculous changes in the retrocæcal lymphatic glands are practically constant. The invasion is, however, limited to a few glands, and they are not greatly enlarged. They are firm in consistency, and show the same lack of tendency to gross degenerative changes noted in the cæcum itself, though they are not infrequently found to have undergone caseation. In exceptional instances the lymphatic involvement is comparatively great, and may extend even to the retroperitoneal glands lying along the aorta, which are transformed into a caseous mass. In a case reported by Auscher[1] this extended even to the subclavicular group.

---

[1] Pilliet et Thierry. Loc. cit.

[2] Schiller. Loc. cit. Case 9.

[3] Sachs. Loc. cit.

[4] Wiener klin. Woch., 1890, S. 878.

[5] Goschel. Aertzlicher Localverein Nürnberg, Münchener med. Woch., 1895, S. 251.

[6] Case of Pilliet and Thierry. Loc. cit.

[7] Caussade et Charrier. Loc. cit.

[8] Czerney und Rindfleisch. Operationen am Magen und Darm. Beiträge z. klin. Chir., Bd. ix., S. 753, Fall 17.

[9] Hartman. Bull. de la Soc. anat. de Paris, 1892, p. 157.

[10] Thierry et Routier. Quoted by Caussade et Charrier. Loc. cit.

The microscopical picture varies much according to the original location, the rapidity of development, and the amount of necrosis or healing in the affected areas. It has a special anatomical character in the hyperplasia of the fibrous and muscular elements of the walls, the villous, bud-like outgrowths of the mucosa, and the changes in the submucous layer. Its essential feature is, however, the tubercle. These are often grouped into small masses of sufficient size to be recognized by the naked eye. They may be confluent or discrete, and show little tendency to become necrotic and disintegrate, as is usually the case with tuberculous tissue, but remain a long time in a state of anatomical preservation. With a decided tendency toward fibrous evolution they add not only to the thickness of the bowel wall, but contribute to the stiffness and rigidity so characteristic of tuberculous tumors of the cæcum. Many times the typical histological tubercle, with its giant-cell and epithelioid cells, is substituted by a diffuse infiltration with small round cells, which led Pilliet[2] to call attention to the striking resemblance it often bears to sarcoma, and to express the opinion that many cases had been presented as malignant tumors. For similar reasons the condition is called "lymphoid tuberculosis" of the cæcum by Courtillier.[3] Tubercles are usually most numerous in the submucosa, which is entirely altered in structure by the presence of vast numbers of embryonal cells. There is a hyperplasia of the mucosa with the formation of tubercles and an enormous embryonal infiltration which may destroy the glandular elements almost entirely.

The polypoid outgrowths of the mucosa are usually covered by intact epithelial tissue and much infiltrated with round cells. Tubercles may be found in them or in the submucosa at their base. The pediculated forms which I have noted contained neither epithelial tissue nor tubercles, and were made up of a rather richly cellular connective tissue with bloodvessels and a dense connective tissue capsule. The buried polypi all contained necrotic centres, and an epithelium largely replaced by tuberculous granulation tissue.

There is a variable but always well-marked thickening of the muscular coat of the bowel due to hyperplasia of muscular and connective tissue elements. Here, also, are found embryonal cells in limited areas, but tubercles are few or wanting. As a single exception to the general rule is a case reported by Rutier[4] in which the thickening of the wall was due to a caseous infiltration of the muscularis. There is also a hyperplasia of the subserous coat, which usually contains a few tubercles and areas of adipose tissue. In a limited number of cases it has been noted that there is a distinct subserous type of the disease, the submucosa, constituting as it does the usual location, being here comparatively uninvolved. Such a case is recorded by Conrath,[1] in which there was a diffuse subserous infiltration not histologically recognizable as tuberculous. In one of the cases of Hartman and Pilliet[2] the serous coat was three times as thick as the mucosa, and one and one-half the thickness of the muscular coat. There was also much round-celled infiltration, without tubercles in the subserous coat, in the case of Pilliet and Thierry.[3]

---

[1] Auscher. Quoted by Caussade et Charrier. Loc. ct.

[2] Pilliet et Thierry. Loc. cit.

[3] Courtillier. Tuberculose chronique de l'angle ileo-cæcale. Bull. Soc. Anat. de Paris, 1896, No. 13.

[4] Rutier. Cited by Conrath. Loc. cit., p. 90.

In much of the literature on the subject of tuberculosis of the cæcum the tubercle bacillus was not mentioned. In a few cases it seems to have been easily demonstrated and abundant. In many, however, it is stated that the bacilli were exceedingly scarce and demonstrated with difficulty. It is safe to say that the tissues are usually very poor in bacilli. The retrocæcal lymphatic glands are the seat of tuberculous disease of much the same general characters as that found in the cæcum, showing the same scarcity of tubercle bacilli and lack of tendency to destructive changes, the condition being, as a rule, rather that of fibrous metamorphosis.

III. Etiology, Pathogenesis, and Course.

The statement of Benoit[4] that chronic tuberculosis of the cæcum, as is the case in ordinary typhlitis, is found more frequently in males than in females, is not warranted by an analysis of the recorded cases. In seventy-seven cases in which the sex was given, Conrath[5] found that thirty-six were males, while forty-one were females. Adding to these the cases of Page,[6] Lediard,[7] Ochsner,[8] Senn,[9] Caussade and Charrier,[10] and those reported in this paper, we have forty males and forty-four females. Thus it seems that there is practically no difference in the susceptibility of the two sexes.

The majority of patients affected are between the ages of twenty and forty years. Adding to the seventy-five cases collected by Conrath, in which the age was given, those mentioned above it give the following table of frequency for each decennium :

Age.	Male.	Female.	Total.
1 to 10	0	0	0
11 " 20	4	7	11
21 " 30	10	14	24
31 " 40	19	10	29
41 " 50	3	6	9
51 " 60	3	5	8

---

[1] Conrath. Loc. cit., p. 92.

[2] Hartman et Pilliet. Loc. cit.

[3] Pilliet et Thierry. Loc. cit.

[4] Benoit. Gaz. des Hôpitaux, 1898.

[5] Conrath. Loc. cit.

[6] Page. Loc. cit.

[7] Lediard. Loc. cit.

[8] Ochsner. Loc. cit.

[9] Senn. Loc. cit.

[10] Caussade et Charrier. Loc. cit.

Occupation seems to have influence only in so far as the abdomen is subjected to more or less violent and repeated pressure or trauma, thus producing a locus minoris resistentiæ. Suchier[1] relates a case in which a specific traumatic influence seems to bear directly upon the etiology. It is that of an agate-grinder in whom the abdomen was subjected to more or less constant pressure twelve hours daily. Case II. of this paper also gives evidence of a traumatic influence. A number of cases have been noted in persons following pursuits in which the abdomen is liable to pressure, such as saddlers and shoemakers.

From certain cases following an attack of typhoid, dysentery, and enteritis it would seem that acute infections or inflammatory conditions of the cæcum play a part in the etiology. This agrees with the general etiology of tuberculosis in other parts of the body, the preceding inflammation lowering the resisting power of the tissues and furnishing a more favorable soil for the lodgement and development of the specific organism. Hansemann[2] has lately brought forward the subject of secondary infection of inflamed tissues with tubercle bacilli, and cites a number of cases illustrating the process. One of these is that of a phthisical patient with typhoid fever in which there were found recent tubercles on the base of a typical typhoid ulcer. Similar cases are cited by Ernst[3] and Birch-Hirschfeld.[4] The irritating effects of prolonged constipation and of foreign bodies exert a like influence.

The etiological influences noted above cannot, of course, be more than predisposing to the localization and growth of the infectious agent in the cæcum. This may reach the cæcum by being taken with food, especially milk and meat. From the known frequency of tuberculosis in cattle it would seem a reasonable inference that primary tuberculosis of the bowel should be a not infrequent condition. Basing conclusions upon the statistics of various investigators it is safe to say, however, that intestinal tuberculosis is, in the vast majority of cases, a secondary affection. This is almost universally true except in young children. In examining 1000 tuberculous subjects Eisenhardt[5] found tuberculosis of the intestine present 567 times. Of these 567 cases 563 were secondary to tuberculosis of the lungs, and three were secondary to tuberculosis in other parts of the body. In the one remaining case the disease was found in the intestine only, but it was considered doubtful if it was a primary affection of that region. Frerichs[6] found but one case primary among 208 of intestinal tuberculosis, and considered that one doubtful. Fenwick and Dodwell[1] found tuberculous ulcers of the intestine 500 times in 883 cases in which the lungs were the primary seat of the disease. Herxheimer[2] furnishes the very interesting fact that of fifty-eight cases of phthisis sectioned from April to November, 1895, he found only one free from tuberculous lesions in the intestine. He quotes Weigert as saying that 90 per cent. of the phthisical patients in Leipzig have intestinal tuberculosis. These figures point toward two things—that intestinal tuberculosis is a very frequent secondary affection in phthisical patients, and that the vast majority of cases of intestinal tuberculosis are the result of swallowed tuberculous sputum. The simple enteritis which so frequently accompanies tuberculosis no doubt contributes largely to the frequent intestinal involvement, though, as has been shown by Orth[3] and by Dobroklonsky,[4] tuberculous infection of the intestine may take place when there has been no preceding inflammatory condition, even when the epithelial covering remains intact.

---

[1] Suchier. Beiträge zur operative Behandlung der Cæcumtumoren. Berliner klin. Woch., 1889, S. 617.

[2] Hansemann. Die secundäre Infection mit Tuberclebacillen. Berliner klin. Woch., 1898, S. 233.

[3] Quoted by Hansemann.

[4] Ibid.

[5] Eisenhardt. Ueber Häufigkeit und Vorkommen der Darmtuberculose. Inaug. Diss., München, 1891. Abstract in Baumgarten's Jahresbericht, 1891, S. 824.

[6] Frerichs. Quoted by Conrath. Loc. cit.

In the primary localization of tuberculosis in the intestinal tract it has been shown by Fenwick and Dodwell[5] that the cæcum is far the most frequent site, the process usually spreading from here to the adjoining segments. They found the cæcum involved in 85 per cent. of all cases, while that region alone was involved in 9.6 per cent. Frerichs[6] found the cæcum involved in 80 per cent. The researches of Eisenhardt,[7] Spillman[8] and Girode[9] and others show similar results. The frequency with which the disease is found present decreases in both directions from this point. The large dilatation of the cæcum and its dependent position make it a favorable location for stasis, and by decomposition of the intestinal contents predispose to inflammatory processes, thus allowing for the easy implantation of tubercle bacilli. As has been shown by Ribbert[10] the cæcum and appendix are also very rich in lymph follicles, and Tchistovitsch[11] has demonstrated that in the development of intestinal tuberculosis the lymphatic elements are first affected, the epithelial tissue being involved only secondarily by a spreading of the process from the follicles. The food or sputum impregnated with bacilli passes with comparative rapidity over the mucous membrane of the œsophagus and the small intestine. It finds a temporary resting-place in the stomach, but here the adverse influence of the gastric juice, demonstrated by Wesner,[1] prevents the development of the organism. The same influence is exerted to a less extent in the upper part of the small intestine.

---

[1] Fenwick and Dodwell. Perforation of the Intestine in Phthisis. The Lancet, 1894, vol. ii. p. 133.

[2] Ueber Tuberklebacillen in verschlossenen verkästen Darmfollikeln. Deutsche Woch., 1895, S. 891.

[3] Orth. Lehrbuch der specielen path. Anat., 1887, Bd. i., S. 839.

[4] Dobroklonsky. Quoted by Tchistovitsch. Contribution a l'étude de la tuberculose chez l'homme. Annales de l'Institute Pasteur, Tome iii. p. 209.

[5] Fenwick and Dodwell. Loc. cit.

[6] Frerichs. Beiträge zur Lehre von der Tuberculose, 1882. Quoted by Orth, loc. cit., p. 841.

[7] Eisenhardt. Loc. cit.

[8] Spillman, 1878. Quoted by Fenwick and Dodwell, loc. cit.

[9] Girode, 1888. Ibid.

[10] Ribbert. Virch. Arch., Bd. cxxxii., S. 66.

[11] Tchistovitsch. Ann. de l'Inst. Pasteur, Tome iii., p. 209.

But the real pathogenesis of chronic hyperplastic cæcum tuberculosis is found in the answers to the questions: Why does one case remain localized when the greatest part, beginning as they do in the cæcum, become quickly disseminated? And why does the same bacillus produce at one time gross ulceration and destruction and at another ulceration with hyperplasia? A review of the clinical histories and the post-mortem findings furnish a basis for explanation in that with active, destructive and disseminated tuberculosis of the intestine there is usually found in the lungs a similarly active process, while in cases of localized chronic cæcum tuberculosis there is quite as frequently found a latent, healed or healing pulmonary involvement. In the phthisical subject there is a lack of general resistance due to toxæmia; the accompanying enteritis gives ample occasion, and the constantly swallowed bacilli continually add to the number of intestinal lesions as the disease advances in the lungs. The facility of extension may also be increased, as suggested by Benoit,[2] by reason of abnormal ferments which enfeeble and irritate the mucosa. On the other hand, in those cases where the lung tuberculosis is slow or healing, the general resistance to the tuberculous infection is good, there is not the same liability to accompanying enteritis, and a small number or no bacilli enter the gastro-intestinal tract. Thus the lesion is able to take a natural course in the conflict between tissue and organism and to pursue that most favorable to the tissue.

The nature of the process is essentially a slow, chronic inflammation of slight intensity. Practically all tuberculous cæcal tumors are poor in bacilli, which may account for the chronicity of the process, though, as Tchistovitsch[3] has shown, caseous transformation does not depend upon the number of bacilli, but rather upon their virulence. Infection with an attenuated race of organisms or an unusual resistance on the part of the tissue may also lessen the intensity of the process and give the tissue opportunity to protect itself. Hartman[4] suggests that the tuberculous ulceration may open an infection atrium to other organisms which contribute to the development of an attenuated tuberculosis. That simple typhlitis is transformed into tuberculous typhlitis is, however, the logical conclusion, and it has been lately shown by Ramond and Ravaut[1] that tuberculous dissemination and destruction proceed more rapidly in the presence of even non-pathogenic bacteria.

---

[1] Wesner. Kritische und experimentale Beiträge zur Lehre von der Fütterurgstuberculose. Habilitationsschrift. Freiburg, 1885. Quoted by Conrath, loc. cit.

[2] Benoit. Gaz. des Hôp., 1898, p. 259.

[3] Tchistovitsch. Loc. cit.

[4] Hartman et Pilliet. Loc. cit.

In primary tuberculosis of the cæcum the general conditions would be much the same as in that contracted from a healing pulmonary lesion. The clinical history seems often to point to such a primary infection, but even where the physical examination fails to show any involvement of the lung there is found post-mortem an old lesion. On account of this slight involvement, or the inability to demonstrate clinically any at all when the tumor is first noticed, many authors have concluded that the pulmonary affection is secondary. Opposed to this view are two facts: the extreme rarity of localized cæcum tuberculosis with no lung findings, and the extreme frequency of slight, ancient pulmonary involvement. Even where a patient with a tuberculous cæcal tumor has died of a later pulmonary tuberculosis there has been found evidence of an old latent or healed preceding process which may have given rise to the cæcal trouble.

As has been already noted, there occurs a subserous form of cæcum tuberculosis leading to hyperplasia and tumor formation. This has been explained by some writers as a hæmatogenous metastasis from the lungs. It has been shown, however, that hæmatogenous metastasis does not often occur in the intestines.[2] Upon the basis of pathological anatomical findings Conrath gives another explanation: 1. In children the mesenteric glands of the cæcum are often found swollen, the enlargement being due to tuberculosis. According to the researches of Orth[3] and others the intestinal canal may admit tubercle bacilli to pass through without itself becoming the seat of disease. Of nine rabbits in which tuberculosis was produced by feeding the bacilli, only seven showed lesions of the bowel; and the intestinal canal of young children is said to be easily permeated by them, the leucocytes playing a large part in the transmission. 2. In young individuals a peritoneal tuberculosis from tuberculous mesenteric lymph glands is not infrequent. Hence, after simple typhlitis or trauma, a tuberculosis resting in the lymphatic glands since childhood—not an infrequent condition—may spring into activity and lead to localized tuberculous peritonitis of the cæcal region and to subserous cæcum tuberculosis of slight intensity and chronic course. The lymphatic glands lie so close behind the cæcum or in its mesentery that the infection can easily pass over. He refers to the case of Suchier,[4] cited elsewhere, in which there was a specific traumatic agency. When both forms are present, he concludes they are from independent sources of infection, the submucous causing the development of the subserous from a resting tuberculous gland.

---

[1] Ramond et Ravaut. Action des microbes sur le developpement du bacille de la tuberculose. Arch. de Med. Experimentale, 1899, Tome xi., No. 4, p. 494.

[2] Quoted from Conrath. Loc. cit., p. 29

[3] Orth. Lehrbuch der sp. path. Anat., 1887, Bd. i., S. 839.

[4] Suchier. Loc. cit.

If tuberculosis is limited to the cæcum and not associated with an active pulmonary involvement its progress is slow, and sooner or later a tumor appears which reaches a variable size. With failing nutrition and general health, due to chronic obstruction, the tissue is ultimately unable to resist the infection and to go on with its excessive repair, and necrosis and abscess formation is a very probable consequence. By the agency of preceding adhesions, which are firm and fibrous, when such a result comes the abscess breaks into a securely walled-off cavity and appears as a localized suppurative peritonitis. The abscess may, however, either primarily or secondarily break through the abdominal wall. This condition, then, presents three possibilities : fecal fistula, anus preternaturalis, or spontaneous healing. The latter is not, however, a frequent result ; and old sinuses, discharging either the pus of a mixed infection or fecal matter, are likely to persist throughout the patient's life.

Extension of the disease may be by the peritoneum itself, resulting in a tuberculous peritonitis—a comparatively rare result ; it may be by the bowel itself, and is then, as already noted, usually in the direction of the colon, resulting either in gross ulceration or in a continuation downward of the hyperplastic process. Its progress is in general by way of the mesenteric lymphatics, the retroperitoneal glands becoming involved as the lesions advance. It rarely if ever travels by way of the blood stream.

IV. Tuberculosis and Carcinoma.

Theoretical considerations and clinical experience led Rokitansky[1] to believe that carcinoma and tuberculosis maintained a mutual immunity. In the later editions of his works he comes more and more to give up this theory, and asserts only that the two diseases are not usually combined, and that where they do coexist it is the rule that the carcinoma follows the tuberculosis.

Rokitansky found early opposition to his theory by Lebert ;[2] and against the theory stands a mass of statistics concerning the finding of both diseases present at post-mortem. Sandu-Miclesco[3] found among 150 cases of carcinoma 9 per cent. combined with tuberculosis. Rapok[4] found thirty-nine tuberculous among 399 carcinomatous subjects. Loeb[5] found among 111 carcinomatous cases thirty-one combined with tuberculosis, while Cahen[1] found that among every twenty cases of carcinoma or fifty cases of tuberculosis there occurs one case in which the two are combined. Williams[2] goes so far as to say that the same conditions predispose to both diseases and that survivors in tuberculous families are much more liable to carcinoma in old age than are other persons. He found that 55 per cent. of 134 cases of carcinoma of the breast came of tuberculous families, and that while the ratio of deaths from tuberculosis in the community at large was 1 in 11, in the parents of the carcinoma cases it was 1 in 3.8.

---

[1] Rokitansky. A Manual of Pathological Anatomy, vol. i. p. 313. Trans. of the Sydenham Society, London, 1854.

[2] Lebert. Beiträge zur Kentniss des Gallertkrebses. Virch. Arch., Bd. iv., S. 214.

[3] Sandu-Miclesco. Quoted in Ergebuisse der allgemeinen path. Morph. u. Phys., Lubarsch-Ostertag., Jahr. 1, Abt. 2, S. 466.

[4] Rapok. Ibid.

[5] Loeb. Ibid.

The investigations of Lubarsch,[3] while showing likewise the frequent combination of the two diseases, leads him to a different conclusion concerning their relations. He found in a series of 6536 autopsies 569 cases of carcinoma in 117, or 20.6 per cent., of which tuberculosis was also present. In a complete review of cases, however, he found that of the non-carcinomatous 3.7 per cent. more were tuberculous than of the carcinomatous; and of the non-tuberculous 1.05 per cent. more were carcinomatous than of those showing also tuberculous lesions. His conclusions that there is a certain degree of antagonism between the two conditions, which he attempts to explain in that carcinoma may produce delicate chemical changes in the blood injurious to micro-organisms, is liable to error, as suggested by Naegeli,[4] in two ways: many fall victims to tuberculosis before the age of forty, when we would not expect to find carcinoma, or an old healed tuberculosis or a beginning carcinoma may be overlooked; but these statistics furnish the valuable fact that the two diseases are often associated in the same body.

Especially destructive to the theory of Rokitansky are those cases in which the two pathological processes are found simultaneously present and active in the same organ. Epithelioma taking its origin upon an old lupus of the skin was early recognized; but the first well authenticated case of combined tuberculosis and carcinoma involving a mucous membrane is reported by Zenker.[5] There was a squamous-celled epithelioma of the œsophagus, with a round ulcer, showing at the edges epithelial pearls and typical tubercles, some of which were caseous. Tubercle bacilli were present in moderate numbers. In a second case reported at the same time, in which the larynx was involved, it was impossible to demonstrate bacilli, though there were typical histological tubercles. A second case, in which the disease was located in the larynx of a man, aged fifty-four years, is recorded by Crone.[1] It presented itself clinically as a carcinoma, and the microscopical examination revealed also a tuberculous proliferation of the submucosa in which the bacilli were demonstrated. A similar case was observed by Baumgarten.[2] It occurred in a woman, aged forty-four years, and metastases in the thyroid and lymphatics showed both carcinoma and tuberculosis in typical form. Bacilli were not to be demonstrated in this case. Cases of carcinoma developing in old tuberculous cavities of the lung are reported by Friedländer,[3] Wolf,[4] and Schwalbe.[5] Claude[6] found in the body of a man dead of pulmonary and intestinal tuberculosis a carcinomatous ulcer of the stomach, in the base of which were found giant-cells and tubercle bacilli.

---

[1] Cahen. Ibid.

[2] Williams. Observations on the General Pathology of Cancer. Medical Chronicle, 1893, vol. xvii. p. 232.

[3] Lubarsch. Bemerkungen ueber das gleichseitige Vorkommen von Krebs und Tuberculose. Virch. Arch., Bd. cxi.

[4] Naegeli. Die Combination von Carcinom und Tuberculose. Virch. Arch., Bd. cxlviii.

[5] Zenker. Carcinom und Tuberculose in selben Organ. Deutsches Arch. f. klin. Med., 1890, Bd xlvii., S. 191.

When the oppositional theory was proven false the question naturally arose: Do the two diseases stand in any causal relation, and, if so, which is primary?

Concerning the manner of combination Lubarsch[7] distinguishes five possibilities. 1. Purely accidental association. To an old healed tuberculosis there is added a carcinoma without in any way influencing or being influenced by the tuberculous affection. To this class belong half of all cases. 2. By the side of an old tuberculous affection with fresh miliary tuberculosis, especially when generalized in the serous membranes, there is found a spreading metastatic carcinoma. In such a case the combination is attributed to the cancer cachexia making a more favorable soil for the tubercle bacillus, so that a new tuberculous infection takes place from the old colonies. Such cases are not frequent. 3. To a well-developed carcinoma there may be added a new tuberculous infection. Such cases are infrequent. Lubarsch could find but three cases in his extensive material. The cases of Zenker[8] and Claude[9] are to be considered as belonging to this class. Lubarsch considered it in no way proven that tubercle bacilli could more easily infect carcinomatous subjects. 4. There may develop a carcinoma upon a chronic progressive tuberculosis. The conclusion is warranted that there exists an etiological relation between the two, the tuberculosis acting not as a direct but as a predisposing cause, as trauma or chronic irritations act as predisposing causes for the development of malignant tumors. 5. Simultaneous development of the two diseases—theoretically possible, but difficult of demonstration.

---

[1] Crone. Arb. a. d. Tübinger path. Inst., Bd. ii., Heft 1. Abstract in Baumgarten's Jahresbericht, 1893, S. 756.

[2] Baumgarten. Ibid.

[3] Friedländer. Cancroid in einer Lurgencavern. Fortschritte der Medicin, 1885, S. 307.

[4] Wolf. Der primäre Lungenkrebs. Fortschritte der Med., 1895, S. 725.

[5] Schwalbe. Entwickelung eines primaren Carcinoms in einer tuberculosen Cavern. Virch. Arch , Bd. cxlix, S. 329.

[6] Claude. La Semaine Médicale, Tome xix., No. 5.

[7] Lubarsch. Loc. cit.

[8] Zenker. Loc. cit.

[9] Claude. Loc. cit.

It is very difficult to explain how a carcinoma of the stomach stands in any causal relation with an old healed tuberculous focus in the lung. It is different when the two are located in the same organ. That the resulting cachexia and altered physiological functions of the one give rise to the development of the other have had many upholders ; and that this may influence some there can be no doubt, but Naegeli[1] noticed that in many carcinomatous bodies at Zurich there were also tuberculous foci which had not been made more active. In other cases he noticed that with the development of carcinoma a miliary tuberculosis set in, and thinks the carcinoma determined the development of it. That the tuberculous cachexia determines the development of the carcinoma does not find upholders in the literature. Certain cases point quite clearly to a secondary infection of malignant ulcers with tubercle bacilli, as the cases of Zenker and Claude. But this is not a frequent condition, and careful consideration in the majority of reported cases of combination points to an old tuberculous focus—caseation, calcification, ulceration, etc.

Ribbert[2] has insisted strongly upon tuberculosis as the direct causative agent, and reports eleven cases in different parts of the body (six of the lip, one each of the pharynx, tongue, eyelid, penis, and mucous membrane of the mouth) in which he found giant-cells between the advancing strands of carcinoma tissue. He was unable to demonstrate the bacillus, and raises the question as to whether the growing tumor may not excite the formation of giant-cells after the manner of foreign bodies. He does not dispute this possibility, but gives it as his opinion that the tuberculosis pre-existed. In accordance with his theory of the development of carcinoma being due primarily to an over-proliferation of the subepithelial connective tissue,[3] he looks upon the tuberculosis as the direct causative agent of the malignant growths.

Clement[4] believed, on the other hand, that the cachexia dependent upon a developing carcinoma gives an excellent opportunity for a fresh tuberculous infection or the renewed development of an old focus, and thus often determines an active tuberculosis. In reviewing the work of Ribbert he admits the tuberculous nature of but one of the eleven cases. He attributes the giant-cells to the irritating action of the advancing carcinoma or to the presence of real foreign bodies, which Krückmann[5] has shown to be frequently present in the granulation tissue so often accompanying malignant growths. In support of his theory of the causative action of carcinoma cachexia, Clement cites four cases. In the first there was an acute development of tuberculous adenitis of the submaxillary glands upon the appearance of a carcinoma involving the mucous membrane of the mouth ; the patient had been operated upon for tuberculous glands of the neck in early life. In the second case a tuberculous adenitis of the axilla followed a carcinoma of the breast of the same side ; the adenitis was attributed to bacilli wandering under the influence of the mammary carcinoma from a resting focus in the lung. The third case is considered one of congenital implantation of tubercle bacilli in the liver, which awaited the cachexia of a carcinoma of the stomach for their development. The fourth case concerns a perivascular endothelioma of the parotid developing in tissue already tuberculous and determining a greater activity of the primary disease.

---

[1] Nacgeli. Loc. cit.

[2] Ribbert. Carcinom und Tuberculose. Münchener med. Woch., 1894, Bd. xli., No. 17.

[3] Ribbert. Beiträge zur Histogenese des Carcinoms. Virch. Arch., Bd. cxxxv., S. 433.

[4] Clement. Ueber seltenere Arten der Combination von Krebs und Tuberculose. Virch. Arch., Bd. cxxxix., S. 35.

[5] Krückmann. Abstract in Ergebnisse der allgem. Path. u. path. Anat., Lubarsch-Ostertag, Jahrgang. I., Abt. 2, S. 467.

Not many authors are willing to attribute the causative rôle to the tuberculosis, and yet this is the most probable thing in the vast majority of cases. After reviewing the literature Naegeli[1] gives it as his opinion that in all reported cases careful examination points to the presence of an old tuberculous focus. This opinion is shared by Ribbert[2] and partially upheld by Lubarsch,[3] Crone,[4] Wolf[5] and others. The correctness of Naegeli's conclusion seems to be borne out by an examination into the case reports. In the fourth of Clement's[6] cases, for instance, the tuberculosis is plainly the older process ; and, even granting that the cachexia caused by the tumor led to an increased development of the infectious process, it is not at all possible that the tuberculosis aided in causing the development of the cancer.

Carcinoma is a comparatively frequent consequence of lupus of the skin, and it can here be easily seen which is the older process. The opposite may occur, but it is certainly not frequent. A certain number of the so-called lupus-carcinomas develop in the scars of healing, but here the inflammatory process acts indirectly as a cause. It is easily seen how chronic tuberculosis might predispose to the development of carcinoma by acting as a chronic irritation or by leaving scars in which carcinoma is prone to develop.

I have no hesitation in concluding that in Case II. the tuberculosis of the cæcum was the primary affection, and bore a direct etiological relation to the succeeding malignant transformation. The carcinoma seems to have taken its origin from the margin of an old tuberculous ulcer and to have begun as a benign papillomatous growth—the almost constant accompaniment of chronic cæcum tuberculosis. Naegeli[7]

[1] Naegeli. Loc. cit.

[2] Ribbert. Loc. cit.

[3] Lubarsch. Loc. cit.

[4] Crone. Loc. cit.

[5] Wolf. Loc. cit.

[6] Clement Loc. cit.

[7] Naegeli. Loc. cit.

draws a like conclusion concerning a somewhat similar case of combination of the two diseases in the ileum, lacking, however, the extreme connective tissue and muscular hyperplasia noted here.

I take this opportunity of thanking Professor Hektoen for material and counsel in the preparation of this paper; Professor Senn and Dr. Morehead for the use of cases, and Mr. Martin H. Fischer, for the drawing here reproduced.

EMBRYONAL RENAL ADENOSARCOMA.

By Maximilian Herzog, M.D.,
PROFESSOR OF PATHOLOGY, CHICAGO POLICLINIC; PATHOLOGIST TO THE GERMAN AND TO THE MAURICE PORTER HOSPITAL FOR CHILDREN, ETC.,

AND

Denslow Lewis, M.D.,
PROFESSOR OF GYNECOLOGY, CHICAGO POLICLINIC; SURGEON TO THE COOK COUNTY HOSPITAL. ETC.

Among the tumors of the kidney we find very peculiarly interesting types having a very peculiar histogenesis. We may mention in this connection those neoplasms arising from inclusions of displaced suprarenal tissue, known now more generally as hypernephroma. There is a type of mixed tumors of the kidney which has been attracting attention for a number of years, the true character of which, however, has been fully recognized only quite recently. These mixed renal tumors occur very early in life, frequently during the first years. They are not very common, but comparatively rare. They generally first attract attention not by any urinary symptoms, particularly not by hæmaturia, but by the increasing size of the abdomen. They grow very rapidly, speedily lead to general malignant cachexia, and destroy the life of the victim either with or without the formation of metastases. These tumors always develop inside of the kidney; the kidney tissue proper, however, does not take part in the proliferating neoplastic processes, but becomes compressed by the new growth and atrophic. Uriniferous tubules and their lining epithelia disappear in consequence of pressure atrophy. What is left of the kidney sometimes sits on the tumor like a flat cap. In other cases neoplasms of this kind proliferate toward the pelvis of the kidney, projecting into it in the form of polypoid masses. These malignant renal tumors of early childhood are so heterologous in their histology that they have been described as carcinoma, sarcoma, endothelioma, rhabdomyoma, and under a variety of compound names.

We are indebted to Birch-Hirschfeld[1] for having first successfully cleared up the confusion which reigned as to these new growths. This author, in his paper on "Renal Tumors," points out that the common histological feature of these neoplasms is the fact that they present a mixture of epithelial-adenomatous and connective tissue elements, and that all of these are proliferating in a most extensive embryonal manner. In the description of these neoplasms Birch-Hirschfeld states that sometimes the character of an adenoma predominates, while the connective tissue elements are less prominent; at other times the opposite prevails. These variable conditions are found not only in different tumors, but in different parts of the same neoplasm. These tumors very frequently contain striated muscle fibres, which in some of the reported cases were present in so large an amount that the new growths were designated as rhabdomyoma or rhabdomyosarcoma.

These tumors do not tend to form early metastases, but, on the contrary, lead to the latter only after the growth has become so very large that it has by pressure broken through the capsule. The neighboring lymphatics are not affected even if the adenomatous type predominates. Speaking about the classification of these peculiar renal tumors, Birch-Hirschfeld says: "We can only classify as pure sarcomata such neoplasms as arise from a proliferation of archiblastic elements without any active participation of epithelial tissues. It appears, *à priori*, possible that there occur in the kidney sarcomata very closely related to the adenosarcomatous mixed tumors. These pure sarcomata presumably would arise from embryonal inclusions equivalent to those archiblastic elements, giving origin to the adenosarcomata, only that the former do not contain any glandular (epithelial) tissue. Tumors of this type might be considered as simple embryonal renal sarcomata."

Birch-Hirschfeld believes that the embryonal renal adenosarcomata take their origin from remnants of the Wolffian body, and gives Eberth credit for having been the first one to suggest this possibility with reference to embryonal tumors of the kidney containing epithelial elements. Eberth tried to explain the presence of striated muscle fibres upon the ground that the connective tissue of the Wolffian body was rich in embryonal muscle cells.

This point is, however, not well taken. The embryonal tissue Eberth refers to gives rise to non-striated, but not to striated muscle fibres.

Birch-Hirschfeld, in advocating the view that the mixed renal tumors take their origin from remnants of the Wolffian body, says that such an origin would explain the intimate relation between the tumor and the kidney and pelvis on the one hand, and the lack of a true blending between kidney substance and tumor tissue on the other.

Since Birch-Hirschfeld published his article upon these embryonal renal tumors there has appeared another very important contribution upon this subject by Wilms,[2] and while we cannot indorse all of this author's views on the histogenesis and histology of these neoplasms, we gladly recognize his as a most excellent and exhaustive study of the subject.

Wilms, in reviewing Birch-Hirschfeld's idea as to the histogenesis of these tumors, says: "Birch-Hirschfeld traces the origin of these tumors back to embryonic inclusions derived from the Wolffian body. However, I think that this attempt at explanation only accounts for the presence of epithelial elements, but the question remains unanswered whence arise the other heterologous elements such as striated muscle fibres, cartilage," etc.

On this point Wilms very appropriately says that the Wolffian body does not give rise to any striated muscle fibres, and that embryonic inclusions derived solely from the Wolffian body cannot be considered sufficient to account for all of the constituents of the peculiar mixed renal tumors of childhood.

If one reads Wilms' comments, one first gains the impression that he repudiates entirely any attempt to make remnants of the Wolffian body responsible for these tumors, and that he looks for the histogenesis of them in embryonic inclusions from the myotomes. It appears settled that the myotomes are those embryonal structures which give rise to the entire system of striated muscles. Cohnheim, as Wilms himself states, had already given it as his opinion that the rhabdomyoma of the kidney arise from embryonic inclusions of myotome tissue. If one, however, discards the Wolffian body entirely and looks to the myotomes alone, one finds indeed the source of the striated muscle fibres and the cartilage, but not the origin of the epithelial structures which these tumors contain. To surmount this difficulty, Wilms, toward the close of his monograph, gives it as his view that the mixed renal tumors under discussion arise from inclusion of the very earliest embryonic development, namely, from an undifferentiated mesodermal tissue which later on, in normal embryonic development, gives rise to the Wolffian body and to the myotome. To support this view Wilms is compelled to assume certain metaplastic processes in the development of these tumors. But these metaplastic processes have not been observed elsewhere, nor can Wilms furnish the least proof that they do occur in the mixed renal tumors. Wilms assumes that the inclusion of the very early undifferentiated embryonic tissue, which later on would give rise to the Wolffian body and the myotomes, forms, when it develops the tumor, irregular masses of round cells. That the latter are differentiated into epithelial cells, nay, more, that these, first present in irregular masses, differentiate themselves later into epithelial glandular tissue. Wilms' own words with reference to this process are as follows (*loc. cit*, p. 62): "The epithelial glands (Drueseuschlaeuche) in the tumor, according to our view, are not of primary origin, but they arise from certain cells of an embryonal tissue still undergoing differentiation. They arise from cells in which, in consequence of our inadequate means, we cannot see future epithelial cells, but which appear first as small round cells in an embryonic tissue."

This view of Wilms appears utterly untenable if one compares it with what is known about normal processes of embryonic differentiation. Where do we find in normal embryonic metaplasia or differentiation of the human embryo any process in which small embryonal round cells later on become epithelia, first aggregated in irregular masses, and these then giving rise to regular tubular glands?

Wilms, in contesting Birch-Hirschfeld's view (which we indorse), that the glandular formations are the primary structures, and that the irregular cell masses are derived from the glands, says: "Against the view that the regular gland spaces are primarily and the cell masses secondarily formed speak several factors. First, the most complete epithelial structures are mostly found in the middle of the tumor. While in the younger parts of the tumor, where we have the youngest proliferation, we only find rudimentary ("angedeutete") glands and large irregular cell masses. In other words, where we have a recent growth we have either only irregular masses of round cells or an attempt (andeutung) at gland formation. . . . In one of our renal tumor cases we found in a detached focus in the suprarenal gland not a single regular gland space, but only cell masses which show the beginning of a glandular arrangement," etc.

These arguments, particularly the statement that the tubular arrangement of epithelial elements is most distinct in the oldest and not in the youngest parts of the tumor, do not at all speak in favor of Wilms' views. Quite the contrary, all the facts cited clearly indicate that the irregular cell masses are the product of a proliferation of epithelial cells which primarily had a tubular arrangement. It is one of the best known and now most uniformly recognized facts of neoplastic proliferation, that the metaplasia of the tumor cells becomes the greater the more removed the latter are in time and space from their original progenitors. Let us look at any malignant epithelial neoplasm. We find that the newly-formed cells first deviate comparatively little from the mother cells from which they sprang. The further we get away from the original starting-point of the tumor the greater, as a rule, is the deviation from the original cell type. This state of affairs becomes generally best marked when we compare metastases with the original tumor. These points have been dwelt upon in a very exhaustive manner by Hanseman.[3] It is very clear that Wilms' detached focus of a renal tumor in a suprarenal capsule, which he cites as a proof of his theory, was a metastasis, and as such showed a large degree of anaplasia and metaplasia of the original tumor cells. While it is one of the most common occurrences to find in tumors a regressive metaplasia, which, as one of us[4] has pointed out elsewhere, may have the character of a truly atavistic metaplasia, it would be an unheard-of condition in malignant tumors to find such a progressive metaplasia as Wilms claims these renal tumors represent. There seems to be no reason for the adoption of Wilms' hypothesis. The very facts, as he describes them, speak against it.

To give our own views as to the histogenesis of these tumors, it is necessary to enter very briefly into a discussion of the development of the myotomes (" ursegmente ") and of the Wolffian body (" urniere "). These structures are developed from the early mesoderm which is first differentiated into the myotome and the lateral plate. Between these structures there is formed a thin bridge known as the nephrotome (" mittelplatte "). In the latter the transverse excretory tubules of the Wolffian body, emptying later on into the Wolffian duct, are formed. While these tubules develop the nephrotome becomes entirely cut off from the myotomes. This is in short the normal course of events.

With reference to the embryonal renal adenosarcomata of childhood, we assume that they owe their origin to an inclusion which is formed in the following manner: The nephrotome is not cut off at the normal site, but in such a manner that a part of the myotome is severed from the main mass and remains in connection with the nephrotome. The separation may take place, so that only a part of the myotome proper is cut off, or a part of the sclerotome may likewise be taken along. If the former is the case, we have the matrix for striated muscle fibres only; if the latter occurs, we have also the matrix for cartilage. If now we assume that a part of the nephrotome (Wolffian body) to which tissues of the myotome proper, or the latter and the sclerotome have become adherent by an abnormal process of embryonic separation, becomes included in the permanent kidney, we have a matrix containing all those embryonic elements which occur in the mixed renal tumors, namely, striated muscle fibres, cartilage, other connective tissue elements, and epithelial glandular structures. The latter, of course, are derived from the excretory tubules of the nephrotome.

This explanation appears to us the most feasible one; it will account for the character of these peculiar renal neoplasms without compelling us to take refuge, as Wilms does, in metaplastic processes unheard of in tumor formation.

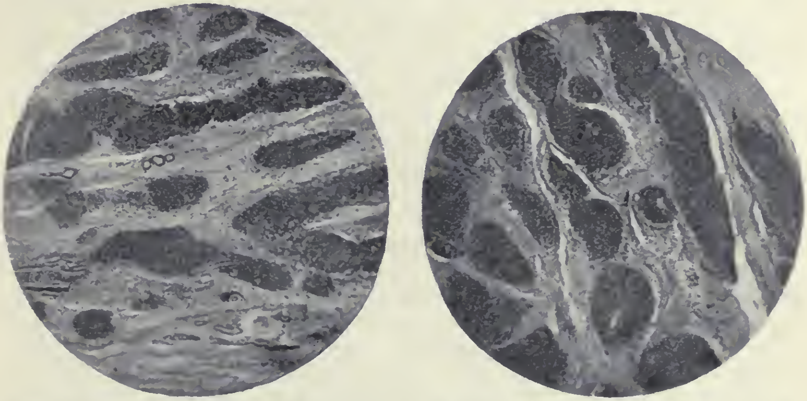
In examining these tumors it is also necessary to consider Brosius'[5] views, that the adenomatous tissue in those neoplasms is not truly epithelial, but of a lymphatic endothelial character. If this were the case, one could without difficulty understand an origin from inclusions of the myotomes alone, since the latter contain lymphatic tissue. A close examination of the glandular spaces and cell masses, however, shows that we are dealing beyond doubt with true epithelial elements. The sections show distinctly that the epithelial nests are sharply defined. They do not gradually fuse into the surrounding connective tissue as in an endothelioma. Wilms, who cites the view of Brosius as to the endothelial nature of the cell nests, only does so to at once discard it, as do other authors who have studied the subject.

The following is a short abstract of the history of the case which we want to report in this paper:

August 2, 1898. The child, operated upon by one of us (Lewis) on this date, was a female white child, sixteen months old, weighing twenty-one and one-half pounds before the operation. The tumor weighed five and one-half pounds. The circumference of the abdomen was twenty-three inches. The child, which had to all appearances been normal when born, developed well and was in good health until May, 1898. Then there was noticed some gastro-intestinal disturbance; however, no diarrhœa. The child then vomited a black substance, and the parents thought that the child had swallowed a piece of the nurse's dress. Dr. Lewis saw the child in June; it was then suffering from a slight bronchitis, which disappeared after three days. About this time there was also noticed a marked swelling of the abdomen. This swelling increased rapidly, and the general health of the child began to fail. A diagnosis of tumor of the abdomen and later sarcoma of the kidney was made. A urinary analysis failed to show albumin or casts. On July 31, 1898, Dr. Walter S. Christopher saw the child in consultation. He concurred in the diagnosis of sarcoma of the kidney. The operation was performed August 2, 1898, by Dr. Lewis, assisted by Drs. Weller, Van Hook, and Henry Norton, and in the presence of Drs. Almon Brooks and N. H. Henderson. The abdomen was opened by a transverse incision over the most prominent part. The tumor had formed very numerous adhesions to the intestines. These adhesions were separated without rupturing the gut anywhere. The pedicle of the tumor was then ligated and the new growth removed. The abdominal incision was closed; an opening of about one inch was left, through which the gauze dressing protruded. When the operation was completed at 3 P.M. the child appeared to be in good condition; the temperature was below 100°, the pulse good. A number of hours after the operation the child took some nourishment, which was retained. The gauze was removed twenty-six hours after the operation; no pus or blood. Thirty hours after the operation the temperature rose to 103°, and within an hour collapse and death followed. The exitus occurred thirty-one hours after the operation. On the following day Dr. Lewis made a partial autopsy. The intestines were found moderately distended with gas, no rupture, no blood, no pus. No metastases were found in the abdomen.

The tumor after removal was more or less globular in general outlines, but somewhat flattened above and below and at the lateral surfaces. The largest diameter extends from side to side and measures 18 to 19 cm.; the largest circumference is 58 to 59 cm. A fairly strong, shining, transparent capsule, nowhere broken through, but intact, invests the neoplasm. The lower surface of the new growth presents a crater-like depression 3 to 4 cm. deep. An incision made at this place shows that we have here located what is left of the compressed remnant of the kidney. The surface of the tumor is coarsely nodular, in consequence of the fact that the neoplasm is composed of a number of roundish nodular masses which vary in size from a hazelnut to a fist. All these masses are surrounded by the common capsule. The larger masses, as can be seen on the incised surface, are again composed of smaller nodules, each one surrounded by fibrous connective tissue septa. The interior of the tumor generally shows a tissue of a fibro-sarcomatous character, but there are also places which convey the impression of carcinomatous tissue. These two kinds of tissues are not intermixed in a heterologous manner, but are, on the contrary, quite separate and distinct. The difference in the macroscopic appearance of different parts of the tumor is explained by the microscopic examination. The parts looking like a carcinoma are made up of epithelial nests and tubular structures, the parts having a fibro-sarcomatous appearance are composed of connective tissue elements.

FIG. 1.



Sections through adenomatous parts of the tumor showing alveolar epithelial nests and tubular glands. × 80.

FIG. 2.

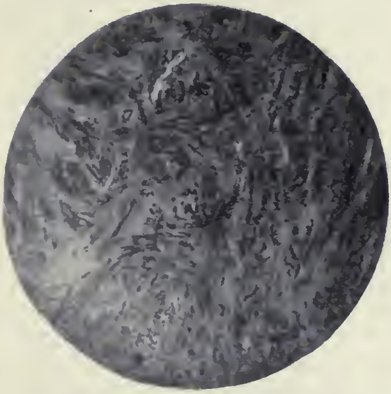


FIG. 3.

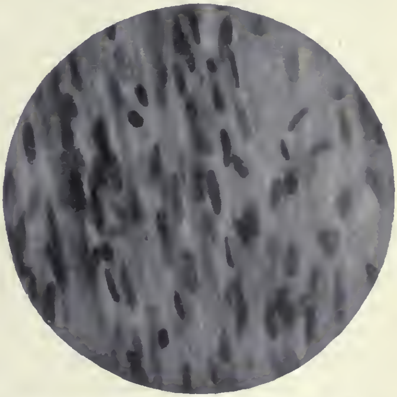


FIG. 2.—Section showing interlacing bundles of striated embryonal muscle fibres. × 80.
FIG. 3.—The same ; oil-immersion magnification.

The compressed remnant of the kidney substance proper forms a conical or pyramidal mass, the apex of which projects into the craterlike depression of the under surface. The base of the cone has a diameter of 6 cm.; the distance from base to apex measures 3 cm. One is able to distinguish in what is left of the kidney the cortical and the medullary substances. Kidney substance and tumor are very distinct from each other. It appears that the latter has nowhere actually broken into the kidney substance.

The microscopical examination shows that the tumor is composed of two different kinds of tissue, epithelial structures and of connective tissue elements. These two types of tissue are distributed throughout the tumor in such a manner that we find in some places a pure picture of an epithelial neoplasm, while other places present the type of an embryonal connective tissue neoplasm. There is nowhere found in the examination of many sections either an intimate blending or a chaotic mixture of the two different types of tissue. They remain, on the contrary, discrete, and each one strictly preserves its own type. In this manner there is created a strong impression that the two kinds of tissue had originated quite separately.

The epithelial elements present themselves in the form of alveolar nests surrounded by connective tissue. Very frequently one sees either more or less in the middle, or situated quite eccentrically in the cell nests, tubular gland spaces. The epithelia lining the latter have very typical vesicular nuclei, possessing a moderate amount of finely granular chromatin, which is distributed in a peripheral manner to the inside of the nuclear membrane. The cell body is cuboidal, the protoplasm of moderate amount. The lumen of the glandular spaces so formed has approximately the size of a larger uriniferous tubule. One also finds glandular lumina of greatly enlarged size. The interior of such large gland spaces is filled with desquamated cells in a state of hydropic swelling. Gland spaces are, however, not only found in the interior of solid cell nests, but outside of them. Such tubular glands are lined by epithelial cells of the character described, and these single rows of epithelia are directly surrounded by connective tissue. The majority of the cells forming the solid nests deviate to a certain degree from the type of the epithelia which line the gland spaces. The former possess more chromatin than the latter, and the increased amount of chromatin fills the nucleus more densely. The latter deviates quite markedly from the character of a typically vesicular nucleus, and looks more like a granular nucleus. The cell protoplasm of the cells of the nests is not cuboidal, but round. *If one compares these cells with those lining the tubules which empty into the Wolffian ducts of human embryos about* 12 *to* 14 *mm. long, one is struck by the great similarity which exists between them.* The epithelial nests show neither a fibrillar nor any other stroma, but the alveoli contain exclusively the cells described. These cells also never show transitional forms leading over to the surrounding connective tissue. Such transitional forms are, as is well-known, always found in endotheliomata. But a picture which might create the suspicion that we are possibly dealing in our case with an endothelioma is not found.

The connective tissue areas of the tumor generally give the picture of a pure rhabdomyoma. A small amount of the striated muscle fibres of the tumor very much approaches the type of adult normal striated muscle. The fibres are cylindrical, the longitudinal, as well as the transverse striæ, are very distinct. The oval nuclei are situated on the sarcoplasm directly under the sarcolemma. In such places, where we also find other signs of degenerative processes, the muscle fibres just described show fragmentation, and they are broken up into the component disks. In general, however, the type which approaches very much normal muscle fibres is only rarely found, and the embryonal, not fully differentiated type, predominates to a large extent. The major part of the tumor is composed of fibres containing several large oval or rod-like nuclei. Whether these cells have a sarcolemma or not cannot be made out. The nuclei are not on top of the protoplasm, but, as can be distinctly seen in transverse sections, inside of the sarcoplasm. The striation is distinct, but very fine. This second class of cells found in the rhabdomyomatous parts of the tumor shows the characters of striated muscle cells as found in the early embryo of mammals.

The muscle cells of this type unite to form bundles, and these interlace each other in an apparently irregular manner. The tissue so formed contains numerous small bloodvessels. The capsule of the tumor consists of densely packed fibres and slender fusiform cells. Remnants of kidney tissue could not be found in the tumor itself, neither was cartilage encountered.

In concluding the microscopical description of the tumor tissue we want to again state expressly that the epithelial as well as the connective tissue elements show an exquisite embryonal type, which is rarely found so very well pronounced in tumors. Sections from the kidney tissue proper show well-marked degenerative changes in the epithelia, particularly in those lining the convoluted tubules. The cells are swollen, indistinct in outlines, the protoplasm is cloudy, and the nucleus either faintly stained or entirely absent. The lumen of the tubules lined with degenerating epithelia frequently contains granular matter, occasionally hyaline matter. Other tubules show a free lumen and normal epithelia. In places completely collapsed tubules are seen. The limbs of Henle show the least changes, and many appear normal. The most prominent changes are found in the glomeruli, the majority of which is atrophic. The change, however, does not consist in a true degeneration, such as, for instance, a hyaline degeneration, but in a true atrophy. The capsule of the atrophic glomeruli is likewise very small and surrounds the latter so closely that there is only left a small lumen. The small atrophic glomeruli are so densely studded with nuclei that it is difficult to distinguish them individually even in thin sections and with high power. The glomeruli appearing normal as to size, likewise show an increased number of nuclei. It appears that there has taken place in consequence of the insult of pressure a proliferative reaction of the vascular endothelium of the glomerular capillaries. Aside from this evident proliferation of vascular endothelia other proliferative processes are not manifest, particularly not with reference to the uriniferous epithelia. Inflammatory reaction is likewise not seen. There is neither an interstitial round-cell infiltration nor the presence of fibrous interstitial tissue. The changes found in the kidney tissue proper all appear to be exclusively the result of pressure and pressure atrophy.

BIBLIOGRAPHY.

1. Birch-Hirschfeld. Beiträge z. pathol. Anat. d. Nierengeschw. Ziegler's Beiträge, vol. xxiv. p. 343.
2. Wilms. Die Mischgeschwuelste der Niere. Leipzig, 1899.
3. Hanseman. Die Spezifizitaet, etc., d. Zellen. Berlin, 1893.
4. Herzog. Eine eigenartige Ependymcyste, etc. Centralbl. f. Pathol., 1898.
5. Brosius. Virchow's Archiv, vol. xcvi.

A CRITICAL SUMMARY OF RECENT LITERATURE

ON

PLASMA-CELLS AND MAST-CELLS.

By Herbert U. Williams, M.D.,
PROFESSOR OF PATHOLOGY AND BACTERIOLOGY, MEDICAL DEPARTMENT,
UNIVERSITY OF BUFFALO.

The two classes of cells which are the subject of this paper have been studied with much care during the past few years and by numerous observers. It is hoped that a summary of the facts they have recorded will be considered timely. The significance and functions of these cells are still problematical for the most part. However, we may be quite certain that they have important work to do, and we may confidently expect to have much light upon them in the near future.

Plasma-cells.

In 1891 Unna[32] described the elements which he called "plasma-cells," believing them to be the same as certain granular connective tissue cells, to which Waldeyer had previously given this name. Later studies indicated that the two were not identical, and Waldeyer[40] advised the restriction of the term "plasma-cell" to that of Unna, finding that the structures named by himself (Waldeyer) corresponded, at least in large part, with the "mast-cells" of Ehrlich, which will be considered below.

Morphology. The plasma-cells of Unna are peculiar in having *protoplasm* that is stained by basic aniline dyes. With Unna's polychrome methylene-blue (described hereafter) the plasma-cells are stained blue-violet, while their nuclei are blue, according to most writers. The outer part of the protoplasm stains more deeply than the inner part, leaving a pale zone around the nucleus. Unna first described the plasma-cell as containing numerous stained granules in its protoplasm. Such granules have not been seen by most other observers. It is not uncommon, however, to find plasma-cells whose protoplasm is not homogeneous, but which contain small clumps and particles that stain somewhat unequally and irregularly.[19] The nucleus is round or oval, and is usually placed eccentrically. Five to eight deeply stained masses of chromatin are arranged chiefly about the border of the nucleus. Some observers have described a nucleolus. The appearance of the nucleus depends much on the manner of staining and decolorizing. Two or more nuclei are occasionally present. In size the plasma-cells vary from being of the dimensions of leucocytes to much larger—average diameter 6–7 $\mu \times$ 8–10 μ.[17] In shape they are round, oval, roughly cubical or elongated, according to whether or not they are limited by connective tissue fibres or the pressure of other cells. Krompecher's[19] illustrations of the different forms of plasma-cells are excellent. The above description of the plasma-cell differs somewhat from Unna's and follows that of v. Marschalkó[23] and others who have written on this subject more recently. Undoubted indirect cell-division seems to have been observed only by Councilman[9] and Mallory,[22] but amitotic division has often been mentioned.[19] Degenerative changes in plasma cells have been described by a number of observers.[39] [19] [9]

Cells whose protoplasm may be stained, but which differ from plasma-cells more or less in other respects—"pseudoplasma-cells"—have been described.[13] [19] Their significance is at present not clear.

OCCURRENCE. Although they were supposed at first to belong only to pathological conditions, plasma-cells have been reported as occurring in lymph-nodes, in the lymphoid tissues of the spleen, and in the bone-marrow, both in man and the lower animals,[16] in ligaments,[28] in the framework of mucous glands of the tongue,[17] and especially in large numbers in the mucosa of the stomach and intestine in man.[9] Information as to their frequency and distribution in normal tissues is not very full. On the other hand, much has been written concerning their occurrence in diseased conditions, and a mere enumeration of these conditions would require several pages. A description of the pathological histology of any lesion can hardly be considered complete now which does not take account of the plasma-cells, if they are present.

Unna's first accounts of plasma-cells were based on sections of lupus. He early directed attention to tumor-like collections of these cells; such a collection he called a "plasmoma." It has appeared since that plasma-cells are abundant in the lesions of tuberculosis, wherever situated, in those of syphilis, leprosy, actinomycosis, and rhinoscleroma[39]—*i. e.*, the so-called "infectious granulomata." They are also frequently seen in large numbers in the stroma of carcinoma. In the main they are most characteristic of rather chronic processes, where they constitute an important part of what is usually termed round-cell infiltration. In acute inflammatory conditions, and especially in acute suppuration, they appear in smaller numbers, or are absent.[17] But v. Marschalkó[23] and Joannovics[17] were able to demonstrate plasma-cells in acute inflammatory lesions artificially produced in animals. Justi[18] found them in recent granulating wounds in man and the dog. Mallory[22] found them in the lesions of typhoïd fever in the intestines, spleen, lymph-nodes, etc. According to Councilman,[9] plasma-cells constitute the bulk of the cell-infiltration in acute interstitial nephritis.

The study of the plasma-cells in the diseases of the skin has been carried on by Unna with great energy, and for the results of his work his *Histopathology of the Skin*[39] may be consulted.

ORIGIN, SIGNIFICANCE, AND FUNCTION. Concerning the origin of the plasma-cells, Unna[32] maintained that they were derived from connective tissue cells, stating that he was able to detect all the necessary transitional forms between the two. Most observers, however, believe that the plasma-cells are derived from the lymphocytes, chiefly the small mononuclear variety.[9,16,17,18,19,23,28] Possibly a few originate from polynuclear leucocytes.[19,17] Furthermore, it is claimed that the plasma-cells may become changed to connective tissue cells, and thus aid in the formation of fibrous tissue.[23,19,28,12] This latter hypothesis would make the production of connective-tissue cells from lymphocytes possible under certain circumstances, the plasma-cells being an intermediate form. It would modify existing ideas very considerably, and convincing proofs will be demanded before it can be accepted. It rests in part upon the same evidence as the theory of Unna above mentioned, namely, the existence of what appear to be transitional forms between plasma-cells and connective tissue cells. For a full discussion of this question, see the papers of Krompecher[19] and v. Marschalkó.[23]

Joannovics[17] takes a middle ground, believing that part of the plasma-cells come from lymphocytes and part from connective-tissue cells; the latter may become connective tissue cells again, while the former undergo degenerations of various sorts. It is not claimed by anyone, I believe, that all or most plasma-cells are destined to become connective tissue cells. The function or significance of these bodies is, therefore, at present uncertain. It is to be noted that they are not distinctive of any particular disease or class of diseases. Their absence from acute suppuration is remarkable. According to Councilman[9] and Mallory[22] they have amœboid properties; they may occur inside the bloodvessels, and may emigrate from the vessels by amœboid movement. Howard[15] states that he has demonstrated that plasma-cells may become transformed into typical eosinophiles, basing his opinion chiefly upon his studies of a case of trichinosis.

If the derivation of plasma-cells from lymphocytes be accepted, we shall have another clue to the origin of the cells in inflammatory exudates. Unna regarded the plasma-cells as being the expression of a degenerative change, whereas v. Marschalkó[23] considered them as evidence of progressive activity in the protection of the organism. Justi[18] thought it likely that they serve to eliminate some unknown substance by way of the lymphatics. Joannovics[17] suggested that their staining properties may be due to their having taken up chromatin from other and degenerated cells.

MAST-CELLS.

The term "mast-cells" was applied by Ehrlich[10] to large cells occurring in connective tissues, the protoplasm of which contained good-sized granules with marked affinity for basic aniline dyes (basophile granules, γ granules of Ehrlich). The name was considered appropriate because these cells occurred abundantly in conditions of congestion and chronic inflammation, and under other circumstances where he supposed nutrition to be heightened. It has already been stated that the plasma-cell of Waldeyer corresponds in the main with the mast-cell of Ehrlich. In size the mast-cells vary from that of a large leucocyte to many times those dimensions. They may be rounded, or they may present extremely irregular figures, which are determined apparently by the cavities of the tissue which they occupy. Forms shaped like an hour-glass or with several long, sinuous processes are common; they remind the observer of the outlines of a moving amœba. Their occasional occurrence in the epithelial layers of the skin can hardly be explained except by supposing that they have the power of amœboid movement.[2, 3] There is a relatively small, round nucleus, somewhere near the middle of the cell, which is usually in part, and sometimes wholly, obscured by the granules. Karyokinesis seems not to have been observed.[2, 3] The granules are the most striking characteristic, as they are usually good-sized, stain rapidly and intensely with the basic aniline dyes, and are decolorized with difficulty. They may be stained by Gram's method, and when they are large, as they are usually quite uniform in size, they may easily be mistaken for micrococci. The granules will sometimes retain the dye when the ordinary methods for staining the tubercle bacillus are used. Furthermore, the granules exhibit with stains the phenomenon of metachromism—*i. e.*, of presenting a shade of color more or less different from that which the dye imparts to the nuclei of the mast-cells and of the other elements of the tissue. The metachromism is most marked with thionin and toluidin-blue. These dyes stain the nuclei of cells of all sorts of blue, while the granules of the mast-cells are violet to red. The metachromism is reported to be very marked with kresyl-violet R.[11] The granules of the mast-cells are said by some to have a certain amount of affinity for acid dyes.[4, 5] Granular mast-cells are sometimes seen which are surrounded by a stained halo of the same color as the granules;[11, 14, 39] also free granules in the vicinity of mast-cells, and mast cells with protoplasm that stains as well as the granules.

The nature of these granules is undetermined. Hoyer[14] tentatively revived an earlier theory of Raudnitz, to the effect that the granules consisted of mucin. After an exhaustive study of the staining properties of mucin, he found that the metachromism shown by mucin and by the granules of mast-cells after thionin staining was very similar.

Unna[36 38] appears to regard this view with favor; it has recently been advocated by Harris[12]. It is to be noted that mucin is extremely capricious in exhibiting metachromism, and that the products of amyloid and other degenerations also show varying degrees of metachromism.

Basophilic granules may occur in blood-cells which are not mast-cells, as in the lymphocytes of normal blood after prolonged staining,[29] and the perinuclear basophilic granules described by Neusser.[6] According to Litten,[20] basophilic granules occur sometimes in the red blood-corpuscles in cases of anæmia; they differ from the granules of the mast-cells in not being metachromatic.

Occurrence. Unlike plasma-cells, the mast-cells are very widely distributed in normal tissues. They have been observed in many different vertebrates, from the frog to man. According to Ehrlich,[10] the mast-cells are likely to be found just under epithelial surfaces, and immediately about the bloodvessels. They appear in the blood of the frog, and are abundant in the frog's tongue. In those animals in which mast-cells occur at all they are likely to be especially numerous in the tongue, as in the case of the bat; in the striped muscles generally they are not numerous, nor are they particularly so in the heart.[10] The rabbit, hare, and guinea-pig are remarkable for the small number of mast-cells in their tissues.[10]

In man the mast cells occur at all periods of life,[26] even in the newborn.[2] While they are comparatively uncommon in early infancy, they are always more or less numerous in the adult. In normal blood they are present in very small numbers and are probably derived from bone-marrow.[11] They constitute part of the cells of bone-marrow. They occur between the fibres of uterine muscle[27] and of the muscle of the intestine. They are usually to be found in the mucous membranes, where they are often numerous. They always occur in the skin, frequently in abundance. They are seen in the tissues of the normal resting mammary gland,[8] also in the active mamma, and, according to Unger,[30] are important in the transportation of fat in the mamma. They occur in the testicle, except in infants under about four months of age.[24] In pathological conditions they exhibit a certain amount of parallelism with plasma-cells in the manner of their occurrence. They are not characteristic of acute inflammation, especially not of acute suppuration.[26] However, Neisser[11] saw a case of gonorrhœa in which the pus consisted only of mast-cells. Also, according to Coen,[7] they appear in the skin in increased numbers, as the result of the application of strong solutions of iodine. They are often numerous about the lesions of chronic infectious processes, such as tuberculosis, but not necessarily; and they are by no means as characteristic of them as are plasma-cells. They are frequently abundant in the stroma of carcinoma, especially of the breast and skin where the fibrous tissue is plentiful. They are generally numerous in uterine fibromyomata[27] and in neurofibromata,[39] and in processes where cicatricial fibrous tissue is forming, as cicatrizing gastric ulcer. They are usually abundant in the mucous membranes of chronic catarrhs, and in the lung of cyanotic induration.[10] According to Ehrlich,[10] stagnation of the lymph-stream favors their accumulation, as in elephantiasis. Cells with basophilic granules occur in normal blood in very small numbers, and are usually supposed to be the same as mast-cells; in leukæmic blood they are not rare, but their significance in leukæmia is not known.[6 29] They are constantly and greatly increased in myelogenic leukæmia.[11]

ORIGIN, SIGNIFICANCE, AND FUNCTIONS. It has been suggested that mast-cells are wandering cells that have taken up disintegrating masses of chromatin;[5] that they have some relation with pigmentation, especially in the skin (Phillipson, cited by Bäumer);[3] that they perform an eliminative function in inflammation (Metschnikoff, cited by Bäumer);[3] also, that they may be formed by a metamorphosis of unstriped muscle-cells.[27] It is noticeable that the mast-cells seldom collect together in large masses, as plasma-cells often do. According to Unna,[39] urticaria pigmentosa forms a striking exception to the usual condition, as its lesions contain accumulations of mast-cells. This observation has been confirmed by others, including Bäumer,[3] who secured a somewhat similar condition by the repeated action of urtica urens on his own skin. Bäumer believed that the mast-cells originate from the connective tissue cells in the adventitia of the bloodvessels; these connective tissue cells showed numerous karyokinetic figures.

Concerning the significance and functions of mast-cells we are almost wholly in the dark. The staining properties of the granules are usually supposed to depend on peculiarities in their chemical composition. Ehrlich and Lazarus[11] regard them as a variety of granular leucocytes; according to Ehrlich's theory, the granules are products of the specific activities of these cells, resembling a secretion; each kind of leucocyte contains only one kind of granule; it is probable that the granules of the wandering cells are destined to be given off into the surrounding structures. From a recent article of Arnold,[1] it appears that he doubts whether all the cell granules are secretory in nature.

TECHNIQUE.

The fixation of the tissues may be accomplished in alcohol,[33] corrosive sublimate,[23] or Zenker's fluid.[9] Müller's fluid is apparently not applicable. The plasma cells are shown well after fixation in 4 per cent. formaldehyde, or in Müller-formol, but the staining of the granules of the mast-cells is modified as mentioned below.

Unna[37] explains the metachromism shown by the mast-cell granules and other bodies by supposing that solutions of the aniline dyes contain small quantities of other dyes as impurities. His alkaline methylene-blue, or "polychrome methylene-blue," is an extreme example, and he states that it contains methylene-violet and methylene-red in addition to methylene-blue.

Unna[33] has given several formulas for making polychrome methylene-blue, of which the following will be found satisfactory; it must stand several weeks to months before using:

Methylene-blue	1
Potassium carbonate	1
Distilled water	100

Sodium or ammonium carbonate may be used instead of potassium carbonate. To obtain the best results the specimens should be over-stained, the excess of color being removed with some decolorizing agent.

Stain in the methylene-blue solution, which may or may not be diluted, fifteen minutes or longer.
Rinse in distilled water.
Decolorize in water to which a few drops of "glycerin-ether" have been added, for a quarter of a minute, or for several minutes, as required, to show beginning differentiation of the structure.
Complete the decolorization with alcohol.
Clear in oil of bergamot or xylol.

One-half to one per cent. acetic acid solution appears to serve as well as glycerin-ether, and alcohol alone nearly as well.

By the above staining process the plasma-cells are stained a blue-violet, their nuclei and other nuclei blue, the granules of mast-cells red. Epithelial cells take the blue stain, sometimes intensely, especially the horny layers of the epidermis; giant-cells are frequently stained as well; also, the products of various degenerations, as amyloid and mucoid, which may show varying degrees of metachromism.[17] The development of a red color in the granules of the mast-cells is favored by extreme decolorization.

Nearly identical results, including the red color of the granules of the mast-cells, may be secured by employing watery solutions of thionin[16] or toluidin-blue, decolorizing with alcohol, or an acid followed by alcohol.[22] The plasma-cells often stain fairly well with ordinary methylene-blue solutions, and sometimes even with the other basic dyes. With basic dyes other than thionin, toluidin-blue, and polychrome methylene-blue, the granules of the mast-cells are well stained, but they are less easily distinguished, because the metachromism is much less pronounced. The mast-cell granules sometimes stain well with hæmatoxylin, but it is not clear under what conditions this occurs.

The writer has found that after fixation with formaldehyde or Müller-formol the mast-cell granules, after staining with polychrome methylene-blue, thionin or toluidin-blue, are colored *blue* or *violet* and *not red*, as occurs after alcohol or sublimate fixation, using two pieces of the same tissue, one fixed with alcohol, the other with formaldehyde, stained in the same solution; the granules of the mast-cells will be much redder in the specimen fixed by alcohol. This difference is most obvious after prolonged fixation and with frozen sections. It is more or less modified by paraffin or celloidin embedding, although the differences in color usually remain quite distinct after embedding. It appears equally well after decolorization with alcohol, acetic acid, and glycerin-ether, provided the decolorization is prolonged sufficiently. This work will be described in detail elsewhere.

In staining cover-glass preparations of blood, it is to be remembered that the granules of the mast-cells are not stained by the Ehrlich tricolor[11] mixture, although they may be stained by the simple basic dyes, such as methylene-blue.

REFERENCES.

1. Arnold. Centralbl. für allg. Path., etc., 1899, Bd. x. p. 841.
2. Audry. Monatshefte für prakt. Dermatologie, 1896, Bd. xxii. p. 393.
3. Bäumer. Arch. für Dermatologie und Syph., 1896, Bd. xxxiv. p. 323.
4. Bergonzini. Anatom. Anzeiger, 1891, Bd. vi.; Abstract in Zeitschr. für wiss. Mikroskopie, 1892, Bd. ix. p. 95.
5. Birch-Hirschfeld. Allg. path. Anat., 1896, p. 156.
6. Cabot. Clinical Examination of the Blood, 1897.
7. Coen. Ziegler's Beitr., 1887, Bd. ii. p. 31.
8. —— Ziegler's Beitr., 1887, Bd. ii. p. 85.
9. Councilman. Journ. Exp. Med., 1898, vol. iii. p. 393.
10. Ehrlich. Farbenanalytische Untersuchungen, etc., des Blutes, 1891.
11 Ehrlich and Lazarus. Normale und path. Hist. des Blutes, Specielle Path., etc., Nothnagel, 1898.
12. Harris. Philada. Med. Journ., 1900, vol. v. p. 757.
13. Hodara. Annales de Dermat. et de Syph., 1895, T. vi. p. 586.
14. Hoyer. Arch. für mikroskop. Anat, 1890, Bd. xxvi. p. 310.
15. Howard. Philada. Med. Journ., 1899, vol. iv. p. 1085.
16. Jadassohn. Berl. klin. Wochenschr., 1893, Bd. xxx. p. 222.
17. Joannovics. Zeitschr. für Heilkunde, 1899, Bd. xx. p. 159.
18. Justi. Virchow's Arch. für path. Anat., etc., 1898, Bd. cl. p. 197.
19. Krompecher. Ziegler's Beitr. zur path. Anat., etc., 1898, Bd. xxiv. p. 163.
20. Litten. Deutsch. med. Wochenschr., Jahrg. 25, 1899.
21. Mallory. Journ. Exp. Med., 1897, vol. ii. p. 529.
22. —— Journ. Exp. Med., 1898, vol. iii. p. 611.
23. v. Marschalkó. Centralbl. für allg. Path., etc., 1899, Bd. x. p. 851.
24. Münchheimer. Fortschritte der Medicin., 1895, Bd. xiii. p. 104.
25. Neisser. Arch. für Dermat. und Syph., 1895, Bd. xxxi. p. 387. (Personal in character.)
26. Neuberger. Versamm. Deutsch. Naturforscher und Aerzte, 1894.
27. Reich. Inaug. Diss., Göttingen, 1893.
28. Schottländer. Ueber Eierstockstuberculose, 1897.
29. Stengel. A Text-book of Pathology, 1898.
30. Unger. Virchow's Arch. für path. Anat., etc., 1898, Bd. cli. p. 159.
31. Unna and Vanderspek. Monatshefte für prakt. Dermatologie, 1891, Bd. xiii. p. 364.
32. Unna. Monatshefte für prakt. Dermatologie, 1891, Bd. xii. p. 296.
33. —— Zeitschr. für wiss. Mikroskopie, 1891, Bd. viii. p. 475.
34. —— Berl. klin. Wochenschr., 1892, Bd. xxix. p. 1240.
35. —— Berl. klin. Wochenschr., 1893, Bd. xxx. p. 222.
36. —— Monatshefte für prakt. Dermatologie. 1894, Bd. xviii. p. 57.
37. —— Monatshefte für prakt. Dermatologie, 1894, Bd. xix. pp. 225, 397, etc.
38. —— Monatshefte für prakt. Dermatologie, 1895, Bd. xx. p. 363.
39. —— Histopathology of Diseases of the Skin, translated by Walker, 1896.
40. Waldeyer. Sitzungsber. d. kgl. preuss. Akad. d. Wissensch., 1895. (Not obtainable in the original.)
41. Westphal. Ueber Mastzellen, Inaug. Diss., 1880. Included in 10.

REVIEWS.

TEXT-BOOK OF THE EMBRYOLOGY OF INVERTEBRATES. By E. KORSCHELT and K. HEIDER. Translated from the German by MATILDA BERNARD. Revised and edited, with additional notes, by MARTIN F. WOODWARD. Vols. II. and III. London: Swan, Sonnenschein & Co., Ltd., 1899.

A TEXT-BOOK OF EMBRYOLOGY FOR STUDENTS OF MEDICINE. By JOHN CLEMENT HEISLER, M.D. Philadelphia: W. B. Saunders, 1899.

THE appearance of an additional text-book of human embryology by an American author bears testimony to the steadily growing appreciation of this fundamental department of anatomy by the profession of this country. When anatomy was regarded simply as the handmaid of surgery and of medicine, and was valued accordingly by utilitarian standards alone, embryology was considered by many as superfluous for such study of the human body as concerned the "practical" man. We still too often lose sight of the important fact that whether the knowledge of our complex organism be gained by the scalpel and the unaided eye, or by the section-knife and the microscope, or whether the subjects of investigation be the form and relations of the various parts of the adult body, or the details and the sequence of the changes incidental to the development of such parts, our study is all to one purpose—the intelligent comprehension of the anatomy of the complex human body.

The importance of an adequate acquaintance with the structural make-up of the various tissues and organs needs no argument these days, when well-equipped laboratories and practical instruction in histology are features in the curriculum of every reputable medical school. That a just appreciation of the significance of many details of the adult body is had only after studying the manner in which the parts and organs are formed is equally evident.

The brilliant investigations of Hertwig, Van Beneden, Boveri, and others regarding fertilization of the ovum have given us definite knowledge pertaining to the details of the changes following impregnation and placed the modern conception of heredity upon a basis of almost mathematical accuracy, in showing the precision with which the chromatin contributed by the two parent germ-cells is mingled within the ovum and subsequently divided between the nuclei of the new cells resulting from segmentation.

The advantages of approaching the study of the brain through embryology is recognized in our best text-books of anatomy, in which the description of the complex adult organ is prefaced by an account of its general development, and justly so, since the significance and true relations of many parts of the encephalon in this manner are best obtained. The now generally accepted interpretation of the pineal body as a rudimentary sense-organ, the recognition of the dual origin of the pituitary body, the significance of the longitudinal striæ on the corpus callosum as parts of a rudimentary supra-callosal gyrus, the morphological value of the so-called fifth ventricle as an isolated portion of the primary longitudinal fissure, the exclusion of the pia from the ventricular cavities by the attenuated wall of the neural tube in localities in which the vascular tunic apparently lies within these spaces, are instances of the many suggestive facts relating to the complex architecture of the brain gained by a study of its development. Much of the advance made in the more accurate tracing of the various fibre-tracts within the central nervous system has been due to investigations upon fœtal organs.

An understanding of the relations of the abdominal viscera to the peritoneum, and especially of the variations in the arrangement of the latter, are greatly facilitated by following the changes which take place in the position and peritoneal investment of the digestive tube during its development. The conspicuous asymmetries presented in the body, as the difference in the relation of the recurrent laryngeal nerves to the great arterial trunks, the greater length of the left innominate and the left common iliac veins, in comparison with the corresponding vessels of the right side, and the difference in the points of termination of the spermatic veins on the two sides, are additional examples of relations requiring the aid of embryology in their interpretation. The interesting and often important variations in the arrangement of the arterial branches springing from the aortic arch are all to be explained as deviations from the usual developmental plan in man, in consequence of which portions of the primitive aortic bows are retained, suppressed or modified, thereby giving rise to the anomalies of the later arteries.

While at every turn the value of an acquaintance with the course of development in the elucidation of the details of human anatomy becomes apparent, it is particularly in the solution of the problems concerning malformations that embryology has been of inestimable service. So intimate has been this relation that the elevation of teratology from the domains of fanciful and grotesque empiricism and speculation to a position of scientific dignity has been possible only after rational explanations had been suggested by modern embryology.

The large and important group of malformations depending upon arrested development especially emphasizes the necessity of studying the normal formative processes. The interesting congenital variations affecting the urogenital tract offer striking examples of modifications brought about by the faulty union of parts which normally fuse, the persistence of passages which usually atrophy and disappear, or the undue preponderance of structures which ordinarily remain of secondary importance. The solution of the still unsettled problem of the production of double monsters will be effected only after further advances in our knowledge of the conditions affecting the earliest phases of development, although the experimental investigations of Born, Schultze, Wilson, Morgan, Schaper and others have supplied already many suggestive facts applicable to the study of duplicities. Further instances of the value of embryology might readily be cited, but the foregoing will suffice to indicate its now generally conceded importance to every thorough student of anatomy and pathology.

While in embryology, as in all departments of biology, the most lasting impressions are gained by personal examination of the actual object, yet even to the laboratory worker the systematic and trustworthy summary of the results of the best investigations in the many fields of developmental research is indispensable, still more is this true of the busy professional man to whom the text-book and the journal are often the only available sources of information relating to subjects outside his immediate field of personal observation. The two books before us constitute a storehouse of embryological data, embracing, as they do, development from the low invertebrate forms to the most highly specialized vertebrate—man.

The first instalment of the English translation of Korschelt and Heider's admirable *Lehrbuch der vergleichenden Entwicklungsgeschichte der wirbellosen Thiere*, by Mark and Woodworth, appeared in 1895, and was welcomed by those especially interested in invertebrate morphology. The first volume included the development of *Porifera*, *Cnidaria*, *Ctenophora*, *Vermes*, *Enteropneusta*, and *Echinodermata*, and, in addition to supplementary matter by the authors, contained valuable notes by the American translators. Owing to unavoidable circumstances the preparation of the succeeding parts of the work was greatly delayed until the task was assumed by the present English translator and editor, Bernard and Woodward, to whose energy morphologists are indebted for the appearance of Volume II., promptly followed by Volume III., with the promise of the early completion of the work in Volume IV., which will appear within the next few months.

A detailed account of the contents of these parts is not called for within the pages of this journal; suffice it to say that the work of the translator and the editor maintains the satisfactory standard set in the first part. Vol. II. discusses the development of *Phoronidea*, *Bryozoa ectoprocta*, *Brachiopoda*, *Entoprocta*, *Crustacea*, and *Palaeostraca;* Vol. III. contains that of *Arachnida*, *Pentastomidæ*, *Pantopoda*, *Tardigrada*, *Onychophora*, *Myriopoda*, and *Insecta*. While the work is necessarily somewhat technical, the descriptions are lucid and concise, and illustrated with fair liberality by figures from various sources. Each section is followed by a classified list of the most important contributions to the subject under consideration. The completed translation of Korschelt and Heider's hand-book will form a worthy companion on the morphologist's book-shelves for the classic *Comparative Embryology* of the still lamented Balfour.

It is of interest to note the results of the editor's attempts to find an acceptable English synonym for the expressive "Anlage" of the Germans. The editor was undoubtedly justified in discontinuing the use of "fundament," which had been suggested and employed in this capacity by Prof. Mark in Vol. I., as well as in his translation of Hertwig's embryology. Dr. Woodward's selection of "rudiment" as a substitute would be most happy were it not for the idea of arrest, reduction, or suppression now inseparably associated with the word. This objection the editor himself recognizes, but suggests the possibility of adopting "vestige" as applicable to the undeveloped structures and reserving "rudiment" to indicate the primary area from which an organ arises. We doubt greatly the possibility of realizing this suggestion, and believe that the adoption of "anlage," while admitting our inability to find an exact substitute for this subtle German term, is the most satisfactory solution of the question.

The purpose of the author of the second text-book before us—*Heisler's Embryology*—has been to present the development of the human body in a manner best suited for students of medicine. Avoiding the introduction of confusing technicalities as far as possible and ignoring much of the more speculative and theoretical considerations found in the larger works, Dr. Heisler has succeeded in describing the essential facts of human embryology with clearness and conciseness. Keeping in view that the development of man was to be the special purpose of the book, the author, as far as practicable, has chosen illustrations representing the human embryo. In addition to the attractive reproductions of figures from well-known authorities, a number of original drawings have been added, among the latter an excellent colored plate, showing diagrammatically the evolution of the urogenital system, which will be of great assistance in mastering this somewhat complex subject. A tabulated chronology of development, carefully prepared and unusually complete, forms an appropriate appendix, which will be of much assistance to the physician when called upon to estimate the age of the product of conception. The preparation of this text-book has placed at the command of student and practitioner an excellent source from which to gain an intelligent understanding of the salient points of human embryology. G. A. P.

DIE TECHNIK DER SPEZIELLEN THERAPIE. EIN HANDBUCH FÜR DIE PRAXIS. Von DR. F. GUMPRECHT, Professor in Jena. Mit 182 Abbildungen in text. Zweite neu durchgesehene und vermehrte Auflage. Jena: Verlag von Gustav Fischer, 1900.

THE TECHNICS OF SPECIAL THERAPY. By F. GUMPRECHT. Second Edition.

A SHORT time ago (THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, September, 1898) we reviewed the first edition of this work, calling attention to its points of excellence and predicting for it a career of usefulness. The fact that the book has already gone into a second edition is sufficient evidence that it is appreciated. In the present edition the author has carefully revised every chapter, so that relatively unimportant parts have been cut out, other parts expanded, and some new topics introduced. The arrangement of the material is altered in such a way as to make it somewhat easier for reference. Among the additions we find a description of tracheotomy, which no doubt deserves a place in such a work, but is more briefly described than many of the other operations, no doubt on account of its full treatment in surgical works. Another addition, the advisability of which we question, is the direction for diagnostic puncture in perityphlitis. The author recommends the procedure because it shows the patient the necessity of an operation and indicates to the operating surgeon the place for incision, and adds that it deserves the widest application. This operation has been abandoned so long in the country where perityphlitis operations were earliest and most extensively developed that it is hardly likely to be taken up here anew; that it is still practised in Germany is a significant fact, and one that does not reflect credit on surgical diagnosis there, while the necessity of postponing an operation until pus can be shown the patient seems to show a very slight appreciation of the advances in surgery among the masses in the land of thinkers. But this recommendation is not, of course, to be attributed to the author, and it forms a striking exception to most of his suggestions. Not only are the various technical directions well selected, but even in the case of comparatively new methods the author almost always has a large personal experience to draw upon, and is thus enabled to give force and vividness to his statements. Besides this, the sections devoted to the results and accidents of the different operations are of great value, especially to those with limited personal experience, while the historical notes and the bibliographical lists can be referred to with profit even by specialists.

The book can be emphatically recommended to all who wish to perfect themselves in one of the most important parts of therapeutic technique. G. D.

A MANUAL OF MODERN SURGERY: AN EXPOSITION OF THE ACCEPTED DOCTRINES AND APPROVED OPERATIVE PROCEDURES OF THE PRESENT TIME. FOR THE USE OF STUDENTS AND PRACTITIONERS. By JOHN B. ROBERTS, A.M., M.D., Professor of Anatomy and Surgery in the Philadelphia Polyclinic; Mütter Lecturer on Surgical Pathology of the College of Physicians of Philadelphia. Second edition, revised and enlarged. Philadelphia and New York: Lea Brothers & Co.

THE author of this book states in the preface that he presents this, the second edition, with the belief "that a volume from a single pen may be more equable in its teachings than a composite book from many minds." This belief is one that is not confined to the author, but has many adherents, at least so far as the one-volume text-book is concerned. In the volume at hand the author has succeeded in embodying, in a comparatively limited space and in a simple and readable manner, the essentials of the art of modern surgery. The many advances made since the publication of the first edition have necessitated the introduction of much new matter, and in this respect the book is well abreast of the times. The chapter on Fractures is especially complete, the discussion of this important subject occupying 138 of the 814 pages. In the discussion of Treatment the author is at times suggestive rather than dogmatic, which if it be a drawback would be one appreciated perhaps more by the student than the general practitioner, and from the stand-point of the student there is something also to be said in favor of supplying the name of the man who devises an operation or describes a method of treatment when that name is usually associated with it, which the author at times, and perhaps purposely, omits to do. The illustrations are fairly numerous, and some of them of superior quality, and we repeat that the book on the whole is a satisfactory *résumé* of the field of the surgery of to-day. J. H. J.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

WILLIAM OSLER, M.D.,
PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

GEORGE DOCK, M.D.,
PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

The Justus Blood-test for Syphilis.—JONES (*New York Medical Journal*, April 7, 1900, p. 513) has recently made a study of the test for syphilis first described by Justus in 1895, and later elaborated by him in 1897. Since that date the only confirmatory report that has been published is that of Cabot and Mertins in 1899.

The test depends on the asserted fact that a single inunction of mercury in all untreated cases of secondary, tertiary, and congenital forms of syphilis causes a reduction of from 10 to 20 per cent. in the hæmoglobin in about twenty-four hours. Justus states that the reduction follows intravenous and subcutaneous injections as well as inunctions, but that the administration of the drug by the mouth has no effect on the blood.

Justus obtained positive results in more than three hundred cases of syphilis. The test was negative in a large series of non-syphilitic cases. Cabot has in part confirmed the results obtained by Justus, although he obtained the reaction in two non-syphilitic patients—one, a case of tertian malaria, and the other a patient with chlorosis.

This test was obtained by Justus also in thirteen out of sixteen cases in which only a fresh chancre and inguinal adenitis were present. Both Justus and Cabot agree that so-called "latent" cases and cases which are subsiding either spontaneously or under treatment do not respond to the test.

During the last six months Jones has tried the test in fifty-three cases, thirty-five of which were luetic, the other eighteen being controls.

The syphilitic cases were subdivided as follows: (1) Seventeen cases of active syphilis not under treatment; of these the test was positive in thirteen and negative in four. (2) One case of active syphilis not under treatment; this case did not respond to the test. (3) Two latent cases; these were both negative. (4) Eight cases of chancre with adenitis; two of these were positive and four negative. (5) Seven cases of chancre without adenitis; in only one case was the test positive, the others being negative.

The control cases—which included five cases of phthisis, one of typhoid fever, one of apoplexy, one of fractured rib, one Colles' fracture, one of drug habit, one of chancroid, and seven of acute alcoholism—were also negative to the test.

In carrying out the test the hæmoglobin was estimated by Hammerschlag's specific gravity method and sometimes controlled by von Fleischl's hæmometer. The night before the second hæmoglobin estimation was made forty to sixty grains of unguentum hydrargyri were rubbed thoroughly into the breast.

As a result of his experience Jones concludes that the test is of value in the recognition of doubtful cases of syphilis, although it is not infallible. Further, the test often fails in two classes of syphilitic cases in which a diagnosis is especially desired, viz., in latent cases and in early chancre, and sometimes at the beginning of the secondary stage. He thinks that the reaction is of about the same value in syphilis as the diazo reaction is in typhoid—that is, its presence in association with other suspicious symptoms is of great value, whereas its absence does not by any means indicate that the disease does not exist.

Spleno-myelogenous Leukæmia, with Disappearance of the Splenic Tumor and of the Myelocytes from the Blood.—McCrae (*British Medical Journal*, March 31, 1900, p. 760) reports a case of spleno-myelogenous leukæmia, in which both the enlarged spleen and the myelocytes in the blood entirely disappeared under treatment with arsenic. This case is apparently unique, as no similar case has ever been reported.

The patient was a male, aged twenty-eight years. He began to complain first in August, 1897. In the spring of 1898 he became weak and nervous and entered the Clifton Springs Sanatorium. His spleen was found much enlarged, and the blood examination in June, 1898, showed 2,680,000 red corpuscles, 584,000 leucocytes, and 45 per cent. hæmoglobin. The differential count of the leucocytes made by McCrae from smears taken at that time showed 23 per cent. of myelocytes. Under treatment with arsenic the blood condition markedly improved, so that in September, when the patient came under McCrae's personal observation the red cells were 4,640,000, leucocytes 9250, and hæmoglobin 68 per cent. There were no nucleated red cells nor myelocytes present. The spleen could just be felt on deep inspiration. The patient was placed on Fowler's solution in increasing doses up to ten drops three times a day.

He again came under observation in November, 1898, when he was admitted to the Johns Hopkins Hospital. The spleen was then palpable 2.5 cm. below the costal margin. The blood examination showed 4,160,000 red cells, 178,000 leucocytes, and 67 per cent. hæmoglobin. The differential count of the leucocytes now showed 20 per cent. of myelocytes.

The patient improved while in the hospital for several weeks, and spent the winter in Florida. In April, 1889, he was again seen. His condition was excellent. The spleen could not be felt, even on the deepest inspiration. The blood-count was practically normal; red cells 5,328,000, leucocytes 5000, hæmoglobin 70 per cent. The differential count was normal. There were no myelocytes nor nucleated red cells found.

The patient, therefore, came twice under observation, with the typical condition of spleno-myelogenous leukæmia. On each occasion, under treatment with arsenic, the leukæmic condition disappeared. The spleen became reduced to the normal size, and the myelocytes disappeared from the blood. At these periods his health was good, and no intercurrent affection existed.

The patient died suddenly in California some months later. The physician in attendance thought that death was due to cerebral hemorrhage.

McCrae then discusses the conditions under which changes in the blood-count in leukæmia may occur. These changes may be considered under two headings: (1) When an intercurrent disease presents itself and (2) when improvement occurs from the effects of treatment, as in the case here recorded.

It is now well known that various diseases, as typhoid fever, influenza, erysipelas, and septic infections, so affect the leucocytes in leukæmia that if the cases were then seen for the first time they might go unrecognized. The leucocytes may become reduced practically to the normal. The same change may result from the effect of treatment. The important point to be remembered, however, is that notwithstanding the fact that the leucocytes may be practically reduced to the normal number per cubic millimetre, yet a differential count will almost always show a considerable percentage of myelocytes.

The interesting point in McCrae's case is that, as a result of treatment, the leucocytes were reduced to the normal number and the myelocytes entirely disappeared from the blood on two occasions. In addition, the spleen returned to its normal size, so that if the patient were seen for the first time at these periods it would be utterly impossible to make a diagnosis of leukæmia. No similar case has ever been previously recorded.

Hæmophilia in the Negro.—STEINER has recently reported a case of hæmophilia in a negro, only one other case in the colored race having been previously recorded. This case was reported by Dr. Hadlock before the Academy of Medicine of Cincinnati, on November 16, 1874. The patient was a mulatto boy, seven years of age, who came under treatment for bleeding from the mouth. The bleeding was attributed to a decayed tooth, which was removed, with the result that uncontrollable hemorrhage followed, resulting in death in forty-eight hours. Inquiry into the boy's family history showed that many of its members had died from hemorrhage from slight wounds.

Steiner's case was a young colored girl, fourteen years old, who sought treatment for hemorrhage from the nose and mouth and headache. She had bled easily from the slightest scratches since childhood. During the two and a half months previous to the date she first came under observation she had had three severe hemorrhages from the nose, losing in all about "half a wash-basin of blood." During these attacks she had severe headaches. On physical examination the only point of interest was a definite sponginess of the gums and the presence of a few petechiæ about the elbows and knees. The coagulation time of the blood was between three and four minutes. The patient was given 15-grain doses of calcium chloride three times a day, according to the line of treatment for hæmophilia recommended by Wright. She did remarkably well.

The hæmophilic history in the family is interesting. The great-great-grandmother was a Scotch woman. The great-grandmother was a bleeder from childhood to her death. She had fourteen children, ten boys and four girls. Of these the patient's mother knew seven, and they were all bleeders. The grandmother and mother of the patient were also bleeders.

From the study of the family tree in this case the writer enumerates the following interesting points :

1. The extraordinary fertility of bleeders' families (a point first pointed out by Wachsmuth) is well shown in the family of the patient's great-grandmother. Five of her children died early, and none of the others, save one, now survive.

2. Of these, three children out of the six known to the patient's mother died young. This accords with the fact that a large percentage of the bleeders die early.

3. Contrary to the usual statement, both the males and the females seem to have been bleeders, but only one (a male) died from the effects of hemorrhage.

4. The preponderance of the males is seen in two of the families named. This excess of sons over daughters has been given as a reason for the rarity of this disease.

5. The bleeding tendency in each instance was transmitted through the females.—*The Johns Hopkins Hospital Bulletin,* February, 1900, vol. xi. p. 44.

Further Observations on Pernicious Anæmia: a Chronic Infectious Disease.—HUNTER (*The Lancet,* January 27, p. 221 ; February 3, p. 296 ; February 10, p. 371, 1900) in a series of articles gives the results of his more recent work on the etiology of pernicious anæmia. From his earliest investigations he concluded that in all probability the blood changes in pernicious anæmia were the result of absorption of a special poison formed within, and absorbed from, some part of the gastro-intestinal tract. His conclusion from a second series of investigations was that " the special factor required to initiate the symptoms peculiar to the disease is the presence, under certain favorable conditions, of specific organisms within the gastro-intestinal tract." His most recent observations have been made with the object of determining the nature and source of the infection pointed out in the previous work.

From a study of seven cases of pernicious anæmia Hunter was led to believe that a cario-necrotic condition of the teeth is a very essential early factor in the causation of the gastro-intestinal disturbances which play such an important part in the symptomatology of the disease. The intimate association between gastritis and decaying teeth was well shown in another case which Hunter reports. This patient did not have pernicious anæmia. She had been suffering from gastritis for eight months. An examination of the teeth showed that they were all false with the exception of three, which were badly decayed and discharged a large amount of pus from their roots. A provisional diagnosis of gastritis caused by the continual swallowing of pus was made. The stumps were ordered to be removed, and there was almost immediately an amelioration of symptoms, although about one week later vomiting returned, the vomitus containing very large numbers of streptococci and staphylococci. A diagnosis of infective gastritis was then made, and, as an antiseptic, three-grain doses of salicylic acid were given three times daily. The improvement was then much more rapid, and in two months the patient was perfectly well and had gained about eleven pounds in weight. Hunter believes that a similar infective gastritis occurs in pernicious anæmia and gives rise to toxic substances which are absorbed into the circulation, causing destruction of the red blood-cells.

Hunter draws the following conclusions from his observations:

"1. Pernicious anæmia is a special form of chronic blood-poisoning—a toxæmia.

"2. It is the result of a special infection of the digestive tract, especially of the mouth and stomach, and probably, although to a less degree, of the intestine.

"3. The chief source of the infection is through the mouth, from long-continued and neglected cario-necrotic conditions of the teeth, and sometimes possibly from stomatitis arising from other causes.

"4. The usual effect of this infection is a chronic infective catarrh of the mouth and stomach, which may in time lead to deeper-seated changes—*e. g.*, ulcers of the mouth and tongue, chronic glossitis, and atrophic changes in the tongue, and chronic gastritis with atrophy of the gastric glands.

"5. Evidences of the infectivity of the organisms of dental decay are overwhelming, and in suitable cases the infective nature of the resulting catarrh of the stomach can also be demonstrated.

"6. The infection is chiefly streptococcal, and possibly derives its special characters from being of a "mixed" character.

"7. Such infection the more readily occurs if the stomach or intestines be already from any cause the seat of disease.

"8. The gastric and intestinal irritation (sickness, retching, vomiting, looseness of bowels, and diarrhœa) so often noticed, and which I find to be even more common than is stated (being recorded in close on to 80 per cent. of cases) is the local effect of this infective catarrh, while the excessive destruction of blood taking place in the portal area is the result of the action of the poisons in the blood.

"9. The fever so commonly met with is not an accidental occurrence, the effect of weakness, but is a feature of the disease, a result of the infective process itself, and its variations correspond to variations in the activity of that process.

"10. Such variations are common—from week to week, sometimes from day to day, in the progress of the disease, even when it is running a fairly progressive course.

"11. In addition, however, the course of the disease toward the fatal termination is often marked by one—sometimes two—periods of marked improvement, lasting, it may be, many months or a year or more, followed by relapses. This character of the disease I have come to regard as the result of a relative immunity, unfortunately only temporary in its nature, conferred by the disease itself—an immunity accelerated and greatly strengthened for a time by suitable medicinal treatment, notably by administration of arsenic.

"12. The above conclusions suggest certain new considerations in regard to treatment, of which the chief are: (*a*) Minute attention to the hygiene of the mouth and especially of the teeth, with the immediate removal of every source of infection there; (*b*) stricter antiseptic treatment of the stomach and intestine; and (*c*) antitoxic serum treatment with the view of antagonizing within the blood itself the poisons absorbed into it."

Hunter thinks that the stomach should be washed out regularly. As an antiseptic for local action on the stomach he finds that salicylate of bismuth and salicylic acid give best results. Where the symptoms point to intestinal rather than gastric irritation Hunter recommends salol, naphtol, calomel, or mercuric chloride. He proposes to use antistreptococcic serum in pernicious anæmia cases, because he finds that pyogenic organisms are always, at least in part, agents in the infection. These measures are only to supplement and not to replace the use of arsenic in the treatment of the disease.

A Case of Multiple Gangrene in Malarial Fever.—According to Osler, there are three groups of cases of multiple gangrene:

1. Raynaud's disease. The gangrene is usually preceded by well-marked vascular disturbances in the extremities, such as syncope, asphyxia, or hyperæmia. It is very often symmetrical, and is usually slight in extent and limited to the fingers or toes, more rarely to the ear-tips or nose.

2. Multiple spontaneous gangrene of limbs. In young or middle-aged persons, without any obvious cause, massive gangrene of one, two, or three extremities occurs.

3. Multiple spontaneous gangrene in association with the acute infections. In measles, typhoid fever, typhus fever, scarlet fever, diphtheria, and malaria local gangrene may occur. There are multiple patches, not symmetrical, and the skin and subjacent tissues are more frequently affected than the extremities. Raynaud's disease may follow any of the specific fevers, but a large proportion of all the cases of local gangrene occurring during or after one of the fevers have nothing whatever to do with this affection.

The French physicians believe that the relationship between Raynaud's disease and malaria is very close, as has been recently pointed out by Barlow and Monro. In the cases collected by the latter, however, there were only 8.3 per cent. with malarious antecedents. Of nine cases of Raynaud's disease which Osler has seen in Baltimore not a single one could be traced to a malarial infection, nor has there been a single case of Raynaud's disease in the very large series of cases of malaria treated in the Johns Hopkins Hospital during the past ten years.

The case of multiple gangrene which the author reports occurred in a case of æstivo-autumnal fever. Similar cases have been reported, but they are rare. The patient was a young man, aged twenty-three years, admitted to the Johns Hopkins Hospital on November 29, 1899. When six years of age he had malaria. Five years ago he had a severe attack of typhoid fever, followed by abscesses in the abdominal wall. During the summer of 1898 he went South as a soldier, and had a second attack of typhoid fever, lasting two months. The patient lived in Baltimore during 1899, and was well until the middle of October, when he was ill in bed for about two weeks with pains in the back and general weakness; no chills, no fever, nor herpes.

The patient had been up and about for a few days, when, on November 2, he noticed blebs about half an inch in diameter on both hands, which were slightly swollen. Subsequent to this extensive areas of vesiculation and of gangrene developed over the dorsum and heel of the right foot, the external malleolus of the left foot, over the sacrum and left gluteal region. These were the situations which were affected on admission. A few days before admission the patient had slight chilly sensations. Although there was nothing in the history to point to malaria, yet the presence of a large spleen led to an examination of the blood, with the result that large numbers of æstivo-autumnal malarial parasites, mainly crescents, were found. The urine and blood examinations and blood cultures were negative. The patient's temperature was never above 100° F. while in the hospital. Quinine was administered in full doses and the larger sloughs treated with linseed poultices made with bichloride solution. Crescents persisted in the blood for a considerable time, although they were rapidly disappearing on December 14th. The gangrenous areas healed satisfactorily.—*The Johns Hopkins Hospital Bulletin*, February, 1900, vol. xi. p. 41.

PEDIATRICS.

UNDER THE CHARGE OF
LOUIS STARR, M.D.,
OF PHILADELPHIA,

AND

THOMPSON S. WESTCOTT, M.D.,
OF PHILADELPHIA.

A Fatal Case of Carbolic-acid Poisoning Due to Absorption by the Skin.—R. ABRAHAMS (*Pediatrics*, March 15, 1900, p. 241) reports the case of a male infant, seven days old, who was born without instrumental interference. The child was normal in all respects, and nursed well. The cord fell on the fifth day, leaving a normal appearing cicatrix. On the morning of the eleventh day, while being undressed by the (untrained) nurse, the baby was suddenly seized with violent general convulsions. Two hours later, when seen by the author, the convulsions were still present, but less severe. There was great dyspnœa, the respiration being shallow and labored; the face was extremely cyanotic; the pulse feeble and rapid, uncountable; the pupils pin-point; corneal and anal reflexes abolished; the whole surface was covered with a cold sweat, while the rectal temperature was 105°. The bowels and bladder acted freely, the urine being of a golden yellow when passed, but turning dark on standing. Inspection of the body showed two grayish-white eschars in the right inguinal region, one the size of a quarter, the other that of a dime. They had the characteristic appearance of a carbolic-acid burn. The baby died ten hours after the first seizure, the general convulsions ceasing two hours before death, but cyanosis and spasm of the face continued to the end.

The poisoning had occurred quite accidentally. The nurse was preparing a carbolic douche for the mother; accidentally she touched the pure carbolic acid with her thumb and index finger. Immediately after she touched the baby's right groin with the moist digits, and five minutes later the convulsions began.

The case is interesting for the rapidity of absorption from unbroken skin, the small amount of the poison, and the long continuance of symptoms before the fatal issue.

Lesions of the Liver in Young Children.—ROWLAND G. FREEMAN (*Archives of Pediatrics*, February, 1900, p. 81) has collected some personal observations upon various lesions of the liver in infants and young children usually under the age of three years. The conclusions are somewhat at variance with the ordinarily accepted ideas; they are summed up as follows:

1. Descent of the liver down the right side of the abdomen, so that the right lobe reaches below the crest of the ileum, occurs not very rarely in infants, and particularly in those in whom the liver is enlarged.

2. Fatty livers occur very frequently in the infants and children which die at the Foundling Hospital, or in about 41 per cent. of all cases.

3. The condition of nutrition of the child, as expressed by the absence of fat in general and wasting of tissue, apparently has no connection with the fatty condition of the liver, the condition of the nutrition in the cases having fatty livers averaging about the same as in the whole number of cases.

4. Fatty livers occur rarely in the following chronic wasting diseases: Marasmus, malnutrition, rhachitis, and syphilis, unless such condition be complicated by an acute disease.

5. With tuberculosis fatty livers occur not more often than with other conditions.

6. Fatty livers occur most often with the acute infectious diseases and gastro-intestinal disorders.

7. The two cases of cirrhosis of the liver examined by the writer ran a comparatively acute course. The livers on section showed a marked hyperplasia of the so-called new-formed bile-ducts.

8. Focal necrosis of the liver may be a lesion of measles.

The Treatment of Whooping-cough Without Drugs.—N. R. NORTON (*Archives of Pediatrics*, April, 1900, p. 266) calls attention to two methods of treatment which are not in general use. The first is that suggested by Bergeon in 1887, which consists in the administration of carbonic-acid gas by way of the rectum. A series of 150 children received this treatment in the New York Foundling Hospital under the author's supervision. Of the total number 143 were apparently decidedly benefited. The vomiting ceased, even in the severe cases, by the second or third day, the number of paroxysms was reduced and their severity diminished; but the duration of the disease was not influenced. The seven remaining cases were not benefited. Another series of twenty cases was similarly treated, but the gas used was not the nascent gas, but had been prepared by a manufacturer and supplied in tanks. In this series the result seemed absolutely negative. The effect upon the diseased condition was explained by Ephraim as being the result of the extra amount of oxygen that reaches the air vesicles, there to be exchanged for the extra amount of carbonic-acid gas that the blood contains as a result of absorption from the rectum.

The second plan of treatment, suggested by Dr. O'Dwyer during the last few months of his life, was the use of the intubation-tube of hard rubber in those grave cases accompanied by frequent and severe vomiting, with consequent loss of flesh and strength.

The author reports three cases under his own observation in which the laryngeal tube was used for an intercurrent diphtheritic stenosis. The effect of the tube upon the paroxysm was very interesting. First there would appear all the signs of a beginning paroxysm, excitement, and the desire to hold on to something for support. Then followed a spasmodic cough of the usual length, as far as expiration was concerned, sometimes even causing cyanosis; but when the inspiratory effort was made there could be no glottic spasm, the air entering the lungs freely through the tube, and the paroxysm terminating abruptly without the least distress or vomiting. After the removal of the tube the disease went on as before its use. With these results and the danger of "retained tubes" reduced to a minimum by careful use of the hard-rubber tube, Dr. O'Dwyer's views of its usefulness in severe cases would seem well grounded.

A Clinical Study of the Lymphatic Glands in One Hundred Cases of Scarlet Fever.—J. F. Schamberg (*Annals of Gynecology and Pediatry*, 1899, vol. xiii., No. 3) has examined a series of 100 cases of scarlet fever to determine the value of the symptom of enlargement of the lymph-nodes. The various groups of glands were found enlarged in the following proportions: Inguinal, 100 per cent., of which 23 per cent. reached the size of a pea and 77 per cent. that of a bean; axillary, 96 per cent.; maxillary, 95 per cent.; posterior cervical, 77 per cent.; anterior cervical, 44 per cent.; submaxillary, 36 per cent.; epitrochlear, 26 per cent., and sublingual, 25 per cent. The maxillary nodes or those just behind the angle of the jaw reached the largest size of any of the lymph-nodes, and were the most frequent to undergo suppuration.

The patients were examined at various stages of the disease, as early as the second and as late as the fifteenth day; but no case was seen on the first day of the disease, and consequently the date of the commencement of the tumefaction could not be accurately ascertained; it is quite probable, however, that it was present upon the first day. In order to compare the lymph-nodes in diphtheria with those in scarlatina a control examination of twenty-five cases of the former was made. This demonstrated that there is a wide variation and lack of uniformity in the adenopathy of diphtheria. As a rule, the glandular enlargement is much less marked than in scarlet fever, but in some cases there may be quite as much swelling. As an aid in diagnosticating the rashes of diphtheria from scarlatina the lymph-nodes are of inconsiderable value. A well-marked enlargement of all the superficial lymph-nodes, particularly the epitrochlear and the axillary, would probably plead in favor of scarlet fever. The adenopathy of measles is not nearly so well marked as that observed in scarlet fever.

It has been observed that the lymph-nodes are not enlarged in scarlatiniform erythema. If this be true, the examination of the superficial lymph-nodes in this eruption would give valuable information.

The enlargement of the glands in scarlet fever does not appear to be proportionate to the severity of the rash, but rather to the intensity of the toxæmia.

The Etiology of Chorea.—KRAFT-EBING (*Wiener klinische Wochenschrift*, 1899, No. 43) contributes an interesting study under this title, based upon an analysis of 200 cases of the disease.

The influence of sex upon the development of the disease is pronounced, 136 of the patients being females and 64 males. As regards age, these statistics confirm the well-known fact that chorea is a disease of childhood and becomes very rare after puberty. After the age of eighteen years only three cases were found among men (two at twenty-six years and one at fifty-four years) and ten among women (from nineteen to twenty-five years).

As to the influence of puberty, these statistics show that of the females 37 cases occurred after the establishment of the menstrual function and 99 before. The only fact that could be invoked in support of the influence of puberty was the relatively large number of cases occurring at the age of twelve years (16 cases), thirteen years (11 cases), and fourteen years (10 cases).

From the view-point of individual predisposition a neuropathic heredity and anomalies of the cranium play an undoubted rôle. This nervous heredity was clearly established in 73 cases, of which 49 were in females (with 9 cases of homologous heredity) and 24 in males (with 3 cases of homologous heredity).

The anomalies of the cranium were very frequent, most often produced by rhachitism and belonging to a hydrocephalic type, more rarely to a submicrocephalic type, and more rarely still to a phagiocephalic type.

Among the other causes responsible for the nervous predisposition are enumerated masturbation, acute diseases, concussion of the brain, and, finally, pregnancy.

The exciting causes in a certain number of cases were found to be articular rheumatism and infectious diseases, in others psychic traumatism.

The influence of infectious maladies was manifest in 75 cases; in 58 of these there was acute articular rheumatism, with or without cardiac lesions. In all these cases the chorea appeared either during convalescence or several weeks after the subsidence of fever.

As to the statement that in order to produce chorea the infectious disease requires a neuropathic soil, these statistics are not confirmatory, since of 75 post-infectious cases a nervous predisposition was present only in 50.

In the cases in which chorea developed after a psychic traumatism the rôle of neuropathic heredity was much more manifest. Of the 66 cases of this class such heredity existed in 64 patients.

The psychic traumatism most often was of the nature of a fright (the bite of an animal, the danger of bodily injury or of falling, the sight of an epileptic, etc.; likewise violent emotions, terrifying dreams, etc.). The disease ordinarily begins one or more days after such a traumatism.

In 59 of the cases the exciting cause could not be ascertained.

It is a logical deduction from this study that side by side with chorea occasioned by an infectious condition there are cases in which the disease is of nervous origin, developing under the influence of psychic traumatism.

A Case of Tetany of the Bladder—E. HAGENBACH BURCKHARDT (*Jahrbuch f. Kinderheilkunde*, 1899, Band xlix., p. 111), after referring to the fact that Sachs, Oddo, and Escherich have mentioned retention of urine as a symptom of tetany in the infant, reports a remarkable observation, in which the retention of urine was the predominant phenomenon.

The patient was a male infant, aged two years and eleven months, weakly, living under bad hygienic conditions, the offspring of an alcoholic. He was brought to the hospital in a state of cachexia, with signs of marked rhachitis. Digestive disturbances and convulsions were noted in the antecedent history. Upon admission the bladder was very full, and the urine contained albumin. The next day the distended bladder reached the umbilicus and convulsions occurred. On the following day retention was again marked enough to require catheterization, and then for the first time contractures of the hands and feet were observed, which presented the characteristics of typical tetany. Passing contractures in the distribution of the facial nerves were observed, with wrinkling of the skin of the forehead and occasional dysphagia. Chvostek's and Trousseau's signs were easily elicited. The knee-jerks were abolished.

The retention of urine was dependent upon contracture of the vesical sphincter. The sound encountered a slight obstacle in the prostatic region, which yielded after a time. These symptoms disappeared after several days, and the child recovered.

[This case serves to emphasize the importance of careful daily investigation of the state of the bladder in every case of tetany.]

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

On Belladonna in the Treatment of Bronchopneumonia in Children.—DR. J. A. COUTTS cites the good effects of belladonna or atropin in the diaphragmatic paralysis of diphtheria, and in diminishing or limiting the secretion into the bronchial tubes and pulmonary tissues, such as occurs after anæsthesia. The action of belladonna in diphtheritic paralysis is *not* direct, probably, but simply prevents the secondary waterlogging of the lungs from inaction, thus warding off impending asphyxia. Therefore, the drug was tried in bronchopneumonia, expecting it would diminish the free secretions of the bronchial tubes and pulmonary tissues, with very gratifying results. Additional treatment by drugs or otherwise proved unnecessary. Rather large doses of belladonna are urged. The mortality under this method of treatment was markedly reduced. Dyspnœa, often so prominent, is relieved after a very few doses; the temperature in the majority of instances soon falls to normal. The course of the disease is also much shortened, lasting days instead of weeks. The extract of belladonna of the late (British) *Pharmacopœia* is recommended to be given in quarter-grain doses every three or four hours, regardless of age. Disadvantages in these large doses are occasionally slight delirium, easily controlled by lessening the dose; in many, however, there has been flushing of the skin, and sometimes a scarlet rash; dilatation of the pupils is infrequent.—*The Pacific Medical Journal*, 1899, vol. xlii., No. 6, p. 329.

Antistreptococcic Serum in Puerperal Septicæmia and Pelvic Cellulitis.—DR. A. G. DEARDORFF reports the use of this serum in an instance where septicæmia occurred four days after a miscarriage before the third month. Curettage and uterine irrigation had not diminished the fever and tympanites. Three weeks after miscarriage thirty drops of antistreptococcic serum were administered. In three hours the temperature fell from 102.5° to 99.4° F. Three days later, there having been a slight febrile movement, thirty drops of the serum were again injected. A normal temperature soon resulted, and convalescence rapidly followed. To a patient with gonorrhœal salpingitis thirty drops of the serum were given. In ten hours diaphoresis became marked and the pulse rate was diminishing; the temperature was normal. Pelvic examination showed a great reduction in the size of the tumor, and little soreness remained. Recovery was complete in one week. To a patient suffering from puerperal fever sixty minims of serum caused profuse diaphoresis and reduction in temperature. Repetition of this dose was required every twelve hours for several days where pyrexia reappeared, and, subsequently, there was complete apyrexia and convalescence. The writer believes the serum also useful in mixed tuberculous infections, by its means largely eliminating the purulent element. He recommends small doses, often repeated (as in the above instance), rather a single large dose.—*New York Medical Journal*, 1899, No. 1069, p. 744.

Dry Antitoxin.—DR. LOUIS FISCHER reports five instances of the use of this remedy, which must be dissolved immediately before use by adding from fifteen to sixty drops of cold sterilized water by means of a sterilized pipette into a bottle of antitoxin. The solid serum dissolves slowly; the greatest caution must be used not to contaminate the solid serum, as it contains no antiseptic, nor should any be added to the water which is used for solution. All of the patients recovered without any sequels; none complained of pain in the joints following injection; none showed a rash. If these and other symptoms of poisoning are due, as has been claimed, to the antiseptics used in the liquid serum, then a distinct advance has been made. No more than 2000 units, or the contents of two bottles, was necessary to effect a cure, although a substantial improvement in the disappearance of the membrane in the pharynx and tonsils, in the swelling of the cervical glands, in the lowering of the temperature, and a corresponding decrease in the pulse rate, and a general improvement in the patient's condition was noted on the following day after the use of 1000 units.—*Pediatrics*, 1899, No. 2, p. 47.

Aspirin.—DR. KURT WILTHAUER recommends this (acetyl salicylic acid) as an addition to the wellnigh innumerable preparations of salicylic acid. It occurs in white crystalline needles, which are soluble in water to 1 per cent. Its most important characteristic is its ready decomposition in very dilute alkaline solutions. It passes through the stomach unchanged and without disturbing that organ. It is of a much more pleasant taste than sodium salicylate, and has no effect upon the heart. In only one instance did it produce ringing in the ears (a very anæmic patient). For adults 60 to 75 grains daily, in 15 grain doses, may be best administered with three times as much sugar, to which a tablespoonful of water has been added.—*Therapeutische Monatshefte*, 1899, Heft 6, S. 330.

[It is unlikely that this remedy is easily decomposed and salicylic acid absorbed, and yet does not produce salicylism. Until this contradiction is explained it may be assumed that this drug produces no unpleasant symptoms because it is inert.—R. W. W.]

The Solvent Action of Certain British and Foreign Mineral Waters on Sodium Biurate.—DR. WILLIAM BAIN sums up the therapeutic significance of a series of experiments by saying that the difference in solvent power is almost infinitesimal, and, in any case, the difference is not due necessarily to the percentage of sodium salts present. He adds, however, that the method of experimentation is open to criticism, for the conditions in the laboratory are different from those in the body, and chemical compounds that come into contact with the biurate in the test bottle are by no means identical with those that after absorption come into contact with it in the tissues. Inferences from chemical experiments as to the activity of a supposed biurate solvent should be modified by administering the substance to a gouty patient, and only when a positive result is obtained can a favorable conclusion be arrived at in regard to its therapeutical value.—*The British Medical Journal*, 1899, No. 2006, p. 1392.

Sodium Sulphocarbolate in the Treatment of Severe Chorea.—DR. J. STACEY WILSON believes that the harsh, dry skin and peculiar venous stasis are due to some bacterial cause, and administered sodium sulphocarbolate, 20 grains, and quinine (sulphate?), 1 grain, every two hours, alternately. Arsenic and digitalis were stopped. Occasionally 30-grain doses of chloral were given, together with hot-packs to stimulate diaphoresis. Much stress is laid on the necessity of adding nutritious diet (such as a strong extract of raw meat, partially peptonized), to counteract the depressant effect of the drugs. The chloral, which previously failed to induce sleep, began to take effect. In the one instance in which this method of treatment was tried rapid improvement occurred and recovery soon followed. The patient was very ill and apparently, under the usual treatment, was rapidly failing.—*The Birmingham Medical Review*, 1899, No. 1, p. 1.

Guaiacol in the Treatment of Malaria.—DR. C. J. WHALEN recommends this drug very highly where quinine has not been successful. The dose is 5 to 45 minims, gradually increased, unless disturbed digestion results. From experience with four patients he believes it best to increase the dose to complete toleration. Each of the patients had failed to respond to quinine, and continued to have chills regularly until a few days after beginning to take guaiacol, when the chills became less frequent, and in all but one patient entirely disappeared.—*The Chicago Medical Recorder*, 1899, No. 1, p. 19.

Xeroform in Military Surgery.—DR. EMILIO PÈREZ NOGUERA, during the late war, cleaned bullet-wounds by abundant irrigation with 1 *per mille* sublimate solution, and applied a thin layer of this substance in powder at the points of entrance and exit, covering all with sublimate gauze and carbolized cotton. This was left as a permanent dressing, under which cicatrization without suppuration took place in the shortest possible time. Sabre-wounds were treated in the same way, with the addition of sutures. With contused wounds with loss of substance the healing was slower, but still without suppuration or the occurrence of soft, spongy, or exuberant granulations. On account of its drying properties it was a valuable remedy when large numbers of the wounded had accumulated, preventing secondary infection. Simple dusting of fresh wounds and covering with pledgets of cotton held in place with carbolized cotton and sublimated gauze was sufficient to keep wounds aseptic for three days—time sufficient to allow of the removal of the wounded to the hospital. Its value as a first dressing is amply demonstrated.—*Revista de Medicina y Cirurgia Praticas*, 1899, No. 600, p. 448.

The Intravenous Injection of Corrosive Sublimate.—DOTT. V. ASCOLI presents the formula which originated with Baccelli as follows: Corrosive sublimate, 1; sodium chloride, 1 to 4; distilled water, 10 parts. This should be kept in a sterilized bottle. The dose of this salt of mercury varies from one-thirty-second of a grain to thrice this amount. When introduced intravenously its action is immediate, as is shown by salivation and a metallic taste; soon elimination commences through the salivary glands. This method should be strictly limited to rebellious and desperate instances of syphilis.—*Il Policlinico*, 1899, No. 19, p. 441.

Dionin as an Analgesic.—DR. RICHARD BLOCK regards the ready solubility of this substance (one to seven in water) and its neutral reaction in solution, permitting of its hypodermatic use, as of decided advantage. Furthermore, it is less toxic than morphine; while one-sixth of a grain of the latter hypodermatically has given rise to untoward symptoms, five-sixths of a grain of the former is entirely devoid of danger. It does not affect the heart nor constipate. It is less narcotic than either morphine or codeine, nor does it interfere with the voiding of urine. For the relief of pain its administration has been satisfactory. In the catarrhal forms of influenza half a grain in suppository gave satisfactory results. As a preliminary to changing dressings, applications of electricity, massage of chronically inflamed joints, or painful external applications, dionin exhibited hypodermatically is of great value. For minor gynecological operations, for which a general anæsthetic is not necessary, a suppository of two-thirds of a grain, introduced a sufficient time before the procedure, markedly diminishes the pain. —*Therapeutische Monatshefte*, 1899, Heft 8, S. 418.

Treatment of Erysipelas with Mercurial Ointment.—DOTT. PROSPERO DEMATTEIS reports eight instances of the use of this method, and concludes that it is efficacious against facial erysipelas even when tending to spread. Its value depends not only upon its bactericidal properties, but as well because it can penetrate the skin and reach the streptococci in the subcutaneous tissue. Therefore, it is valuable in gangrenous erysipelas and in the virulent forms. —*Gazzetta degli Ospedali e delle Cliniche*, 1899, No. 118 p. 1244.

Suprarenal Extract in Diseases of the Eye.—DR. W. H. BATES, from an extended experience, reports that this has cured forty patients suffering from acute catarrhal conjunctivitis, with other treatment, after one or two instillations. In chronic conjunctivitis the relief is temporary. Purulent conjunctivitis and trachoma were benefited, but never cured, by the extract alone. In the treatment of keratitis it was always necessary to use other remedies. In corneal suppuration the extract did not prevent the formation of pus, because it is not an antiseptic. It is not curative in iritis. It only relieves congestion, but has no beneficial effect on the constitutional cause. In chronic iritis the effect is but temporary. A valuable property of the extract is that it, by relieving congestion of the iris, materially assists atrophine in dilating the pupil. In subacute and chronic purulent dacryocystitis the extract is rarely curative, because an organic stricture of the nasal duct is generally present. The astringent property of the extract is invaluable in making the differential diagnosis between strictures of the nasal duct, due to swelling or inflammation of its mucous membrane, and impervious organic strictures. In the former it finds its way into the nose when syringed into the sac through the puncture, and the stricture can be cured by treatment without operation. Short operations on normal eyes are usually done painlessly with cocaine alone. But in nervous people, inflamed eyes, eyes congested after recent or prolonged operations, and in bloody operations, cocaine does not usually secure complete anæsthesia; here the extract is of great service.—*Archives of Ophthalmology*, 1899, vol. xxviii. p. 293.

Suprarenal Extract in the Treatment of Addison's Disease.—DR. R. A. BATE reports the treatment of a patient, aged fifty-four years, in whom the disease was apparently induced by a blow, causing depression of the sternum and deranging the semilunar ganglia, or at least the suprarenal plexus, thus interfering with the sympathetic chain (tonic to the walls of the bloodvessels); dilatation of the bloodvessels, with consequent congestion of the suprarenal bodies, followed. A cylindrical aortic aneurism was present, which might directly press on the left adrenal. The symptoms of Addison's disease were marked. One-twelfth of a grain of the extract of suprarenal glands of sheep was given three times daily. Treatment has been continued for two years at intervals. Asthenia, nausea, faintness, and pigmentation have almost entirely disappeared. Twice, when the extract could not be obtained for ten days, attacks of severe faintness, clammy sweats, and muscular twitchings, with fever and bounding pulse, resulted ; they were relieved on the exhibition of the drug. Suprarenal extract is recommended in exophthalmic goitre as being a true antidote of thyroid extract. It is indicated in all conditions exhibiting loss of muscular power, in subnormal temperature with asthenia, in anæmia and neurasthenia, though how it is to act in these conditions the author does not state.—*The American Practitioner and News*, 1899, vol. xxviii. p. 90.

Hot-air Treatment of Disease.—MR. F. G. DOUGLAS KERR finds that (1) in gout this is a most valuable aid in the acute stage, during which it is not customary to employ thermal baths. Even one bath affords considerable relief from pain, which is appreciated as soon as the temperature rises above 300° F.; this lasts during the bath, and continues for hours afterward ; in fact, the pain is seldom so severe again. Two baths may be given each day—one to the whole body in the morning, and a local one in the evening to the part affected. (2) In chronic rheumatism undoubtedly good results after a time have followed its employment both in articular and muscular forms. (3) In chronic phlebitis some of the most satisfactory results have been obtained even in old-standing cases, when swelling was a source of great inconvenience. A marked diminution in the size of the limb resulted from one bath, and, after a further course, the swelling became permanently less or entirely subsided. (4) In sciatica and other nerve-pains the results have been conflicting. All patients experience relief while in the bath ; some have rapidly improved, and others have taken on acute symptoms. (5) In rheumatoid arthritis better results have been obtained than from any other treatment. (6) Good results have also been obtained in general debility and anæmia when no counter-indications exist to their use.—*The Practitioner*, 1899, vol. lxiii. p. 401.

Liquid Air: Its Application in Medicine and Surgery.—DR. A. CAMPBELL WHITE reports that in less than one minute, by means of a spray of liquid air, the skin and subjacent tissues are frozen hard as ice ; the circulation returns quickly without injury, provided the part is not the tip of some extremity where subsequent mortification may take place. The application causes no pain, except some initial slight tingling. Complete anæsthesia results, though the part be not frozen solid. An intermittent spray is recommended where local anæsthesia is required for some minutes. Great local stimulation can be obtained by repeated spraying at short intervals. The involuntary fibres contract, and also the bloodvessels to the last degree, and as quickly dilate on stopping the spray. Varicose, specific and chancroidal ulcers treated by the spray are immediately stimulated ; there is little pain ; granulations soon appear ; usually one or two applications a week suffice. Dry dressings should follow (aristol) in preference to unguents. Abscesses, carbuncles, and buboes are wholly aborted with one thorough freezing. When the process is far advanced several applications at twenty-four-hour intervals are required. After incision, if liquid air is applied to the base of a carbuncle or bubo, curetting is unnecessary. Pain is instantly relieved. No sloughing follows, except where the overlying skin is devitalized by tension and inflammation. When sloughing does occur the resulting ulcer readily heals. Sciatica, herpes zoster, intercostal and facial neuralgia have been afforded permanent relief by treatment of the spinal end of the nerve involved with the liquid air spray. Neither blistering nor sloughing followed facial erysipelas, because the extent of the surface involved was treated by rolling a glass bulb filled with liquid air over the inflamed tissues. Inflammation and pain subsided at once. The treatment of trichophytosis gave negative results. Lupus erythematosus treated at intervals for two months entirely desquamated, leaving the skin healthy, slightly reddened, with no eschar. Recurrence has not followed. Several patients with carcinoma thus treated have been reported as cured, but too short a time has elapsed to draw any definite conclusion. Where it is desired to remove tissue, as a nævus or wart, a cotton swab is dipped in the air and applied to the part; complete destruction of tissue follows. Liquid air is not antiseptic, but the great cold inhibits bacterial activity, and repeated applications will thus serve the purposes of antisepsis.—*The Medical Record*, 1899, vol. lvi. p. 109.

The Treatment of Leprosy by Injection of Calmette's Antivenomous Serum.—Dr. R. S. Woodson reports a single instance of its successful use, the diagnosis having been established by the microscope. The loose tissue of the interscapular region was selected, and the dose varies from three-quarters at first to five drachms toward the close. Great care was observed in the sterilization of needles and syringes, and the patient was placed in as perfect a hygienic condition as was possible. During the treatment the patient received large doses of hoang-nan, which contains both strychnine and brucine. Very little reaction was noticed during the first week, beyond a slight elevation of temperature, until the ninth day, when it reached 101° F., and the patient suffered from headache and malaise. The patient had suffered from mixed leprosy for seven years, and was under treatment two months, during which time she received sixteen ounces of serum. At the end of treatment the leprous expression had been lost, the supra-orbital infiltration had disappeared, that on each side of the nose and over each cheek had diminished perceptibly. The bluish color of the back had changed to a healthy red, and the telangiectasis diminished. There were no sores, and but one tubercle remained. All anæsthesia had disappeared, so that the injections were painful. The general condition had become excellent. Time alone can determine whether the remarkable improvement will be permanent.—*Treatment*, 1900, No. 21, p. 670.

The Treatment of Diphtheria with Oil of Turpentine.—Dr. Wilbur C. Wright administers teaspoonful doses of undiluted turpentine to a child from ten to sixteen years old. This is repeated every two hours until four to six doses have been given, then omitted for forty-eight hours. In only five instances of thirty-seven has it been necessary to repeat the remedy. No deaths occurred. No renal complications have been observed, although a few patients suffer from vomiting, which, however, subsides within a few hours. The additional treatment consists in small doses of mercuric biniodide and sprays of solutions of hydrogen dioxide.—*The Post-Graduate*, 1900, No. 1, p. 83.

Acoin.—Dr. Gomperz has employed this substance in 2 per cent. solution for aural and nasal operations. It irritates more than a 10 per cent. solution of cocaine, and is inferior in anæsthetic power. It does not contract the bloodvessels as does the latter, which still remains the preferable anæsthetic. —*Therapeutische Monatshefte*, 1900, Heft 1, S. 35.

[Acoin is chemically dipara-anityl-monophenetyl-guanidine hydrochlorate.—R. W. W.]

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D.,

OF NEW YORK.

Ileus After Abdominal Section.—Werth (*Monatsschrift für Geb. und Gynäkologie*, October, 1899) reports eleven cases of intestinal obstruction in one thousand laparotomies, five patients recovering, these favorable results being due, in the writer's opinion, to the fact that he always reopened the abdomen in every case in which symptoms of ileus appeared.

Intestinal obstruction may follow perfectly aseptic operations. To avoid this complication he recommends Trendelenburg's posture, a small incision as near as possible to the symphysis, and extraperitoneal treatment of the tumor.

Intestinal adhesions may occur along the line of the wound, at the stump, and especially in Douglas' pouch. To avoid the separate suture of the peritoneum, covering the stump and temporary isolation of the cul-de-sac by distention of the bladder are advised. To prevent atony of the intestinal muscle, purgatives before operation are to be interdicted. Pain is best relieved by phosphate of sodium, administered hypodermatically, which does not affect peristalsis.

Dangers of Curettement.—Martin (*Ibid.*) calls attention to the fact that the curette should never be used without an intelligent idea of the possible risks involved. Among these are perforation of the uterine wall, injury to the muscular layer, the detachment of thrombi and breaking down of the protecting wall of granulation tissue in puerperal uteri. He adds the following cautions: Anæsthetize the patient; make a thorough bimanual examination beforehand; fix the uterus with a volsella and explore the cavity with a sound in order to determine its size and shape; use a blunt instrument; control the movements of the instrument by placing one hand over the fundus uteri; if a beginner, practice the operation frequently on the manikin.

Tuberculosis of the Uterus.—VASSMER (*Archiv für Gynäkologie*, Band lvii., Heft 2) reports six cases of uterine tuberculosis, from which he deduces certain facts with regard to diagnosis and treatment. Amenorrhœa, less frequently menorrhagia and metrorrhagia, is the earliest symptom that the endometrium is affected, although in one case the disease was so limited that menstruation was not affected. So long as the uterus remains healthy the periods may be regular, even when the tubes are extensively diseased. The absence of a discharge from the uterine cavity was noticeable, so that the diagnosis was only made after an examination of curettings. Enlargement of the uterus was seldom noted. The cervix was not affected in any instance; in fact, the immunity of the cervix and portio from tubercular disease has been noted by all writers.

The writer doubts the possibility of curing tubercular endometritis by curettement and cauterization, and advises a radical operation. He raises the interesting question whether acute miliary tuberculosis of the corpus uteri following abortion, or later at term, may not be due to infection from a tubercular placenta.

Dermoid Tumors of the Ovary.—KROEMER (*Ibid.*) concludes an elaborate paper on this subject by assenting to Pfannenstiel's statement that dermoid and teratomata of the ovary are ovulogenous tumors, since they also include three layers of germ epithelium. It is still doubtful what influence causes the original impulse to the formation of a neoplasm in the ovum. The process cannot be described as parthenogenesis, since this is a physiological one by which an individual capable of active existence is produced.

The cleavage of the ovum which is to produce a dermoid is a pathological process, since only those portions of the fœtus which develop early are perfectly formed, hence the prominence of the ectoderm and cephalic extremity. The other parts are non-developed or malformed. Moreover, the differentiation is one-sided, being often limited to a single organ. The whole subject, like that of the differentiation of sex in the ovum, is still in its infancy.

Adenomyoma of the Round Ligaments and Posterior Vaginal Wall.—PICK (*Ibid.*) has made a careful study of these neoplasms, with special reference to their relation to similar growths of the uterus and tubes. He believes that the glands and cysts found in them are derived from embryonal remains of the Wolffian body within the paroöphoron, and that this fact supports Recklinghausen's theory with regard to the similar origin of certain adenomyomata of the uterus and of the muscular wall of the tubes.

Papillary Cystomata of the Ovary.—UFFENHEIMER (*Münchener med. Wochenschrift*, 1899, No. 22) concludes a paper on this subject as follows: Papillary cysts develop from germinal epithelium by a primary outgrowth of the latter in the form of pouches, the first development being purely epithelial. It has not yet been proved that papillary cysts can develop from the epithelium lining follicles.

The sudden appearance of ciliated epithelium in these cysts is in consequence of a metaplasia, which is readily understood by reference to ordinary embryological facts. Papillary outgrowths may grow spontaneously in superficial cysts, or may break through their walls and extend to surrounding tissues. Normal ova may be found in follicles whose walls are partially destroyed. Psammomata are found in the early stages of papilloma, and hyaline degeneration of the vessels is present.

Tumors of the Abdominal Wall.—OLSHAUSEN (*Zeitschrift für Geb. und Gynäkologie*, Band xli., Heft 2) believes that these neoplasms belong to the domain of gynecology on account of their diagnostic importance. Fibromata are most common, the writer having seen twenty-two in twelve years, the majority being in patients between the ages of twenty-five and thirty-five. Almost without exception the cases reported have been in women who had borne children, and the influence of pregnancy is proved by the fact that in several instances (25 per cent. of the writer's cases) the neoplasm first appeared at this time. The immediate cause of their development is unknown, since we cannot accept without question Herzog's view that they are due to tearing of the abdominal muscles, although there is apparently some traumatic element present. Virchow has called attention to the fact that they often spring from the posterior layer of the sheath of the rectus, which would also seem to favor the theory of a traumatic origin.

In eleven of the author's cases the tumor was situated in the sheath of the rectum above the umbilicus, nine developing from the posterior layer; in two the external oblique and in five the internal oblique muscle was the seat of the neoplasm. In five cases the tumor was attached to bone by a thick fibrous pedicle, as has been noted by various authors. The growth varied in size from a hen's egg to a fist, though myxofibromata of the abdominal wall have been described weighing from fifteen to thirty or forty pounds.

Their growth may be quite rapid, especially in the case of myxofibromata. The anatomical structure is usually that of pure fibroma, those rarely round and spindle-cells are found. There is no evidence that sarcomatous degeneration occurs; in fact, these tumors are entirely benign, resembling histologically ovarian fibromata, which have often been erroneously regarded as sarcomata on account of the presence of cell infiltration.

The development of other fibromata in the abdominal wall after removal of the primary growth should not be regarded as a true recurrence, since in nearly all the reported cases they have appeared at a new site.

The symptoms are purely local, being due merely to the size of the tumor. Pain is exceptional, being present in only one of the twenty-two cases reported by the writer.

The diagnosis is usually easy on account of the prominence and superficial location of the tumor, its lateral as compared with its vertical mobility, and the fact that it can be grasped in the hands and isolated from the abdominal cavity. All these distinctive signs may be absent, however, when the tumor is of large size, so that it may readily be mistaken for an intra-abdominal neoplasm.

The removal of these growths presents no difficulties when they are small, as it is possible with care to avoid opening the peritoneal cavity. They may often be enucleated from the muscle without injury to its fibres. In any case it is usually possible to suture the different layers without difficulty, without employing drainage, primary union being the rule if proper care is exercised to control the oozing and to leave a perfectly dry wound.

OBSTETRICS.

UNDER THE CHARGE OF

EDWARD P. DAVIS, A.M., M.D.,

PROFESSOR OF OBSTETRICS IN THE JEFFERSON MEDICAL COLLEGE; PROFESSOR OF OBSTETRICS AND DISEASES OF INFANCY IN THE PHILADELPHIA POLYCLINIC; CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE WOMAN'S MEDICAL COLLEGE; VISITING OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL, ETC.

Intra-uterine Amputation in an Upper Extremity by Amniotic Bands.—WOLFF (*Archiv für Gynäkologie*, 1900, Band lxvi., Heft 2) reports the interesting case of a fœtus born prematurely by spontaneous delivery which presented two amniotic bands attached to the upper extremities. These bands took their origin at the side of the umbilical cord, and were attached to the phalanges of the middle fingers. So firm was the connection between the digits that these bands had practically accomplished the amputation of the ends of the fingers.

In reviewing the subject Wolff calls attention to the fact that such an occurrence may arise in one of two ways: Excessively active and strong fœtal movements may rupture the amnion, causing one of the fœtal limbs to protrude through the rent. The second and more usual explanation of such an occurrence is found in an inflammatory process in the amnion by which this membrane becomes adherent to some portion of the fœtus. The latter is thought to have been the case in the instance reported.

A Case of Superfœtation.—In the *Archiv für Gynakologie*, Band lxvi., Heft 2, 1900, WOLFF reports the case of a young woman who died of abdominal septic infection following an attempt to commit abortion. An infected sound had been thrust through the vagina into the abdominal cavity.

Upon opening the uterus twin pregnancy was present, with fœtuses differing in sex, in size, and in the location of the placentæ. When the ovaries were incised two corpora lutea of distinctly different ages were found in one ovary.

Difference in size and weight with twins is not uncommon, and would of itself have been no proof of superfœtation. The difference in the corpora lutea, however, was sufficiently marked to make the diagnosis most probable.

Decapitation with Braun's Hook.—In the *Centralblatt für Gynäkologie*, 1900, No. 12, BRAUN-FERNWALD replies to recent criticism upon the use of this instrument and gives the results of his observations in the Vienna clinic. In 23,929 births during the last seven and a half years it was thought necessary to perform decapitation fourteen times. In ten of these patients the puerperal period terminated without fever. One case had but slight fever two days after the birth of the child, while three had septic complications more or less severe. One of these patients died of puerperal sepsis. Fruitless attempts at delivery had been made in these cases before the patient entered the hospital.

The Treatment of Eclampsia with Saline Infusion.—At a recent meeting of the Edinburgh Obstetrical Society, JARDINE (*British Medical Journal*, 1900, p. 767) reported twenty-two cases of eclampsia treated by this method. The material employed for injection was 1 drachm of acetate of sodium and 1 drachm of chloride of sodium to a pint of water. As a rule, 10 minims of tincture of veratrum viride were given in each case. Only one of these patients had the first fit during the puerperal period. Six of the twenty-two cases died, one from perforating duodenal ulcer. This death-rate compares favorably with that of other methods of treatment.

Puerperal Septic Infection.—MACHARG (*British Medical Journal*, 1900, p. 373) reports the results of his investigations in fifty-seven cases of puerperal septic infection. Thirty-one of these cases died, and in twenty-one a post-mortem examination was obtained.

Primiparæ were affected in fourteen of these cases. In four premature labor had occurred, and in two abortion. Labor itself was abnormal in thirteen. Delivery was accomplished by the use of instruments in eight, while post-partum hemorrhage was present in three cases. Nearly all of these patients showed some traumatism as the result of labor. Severe injury occurred in nine cases. In most of these patients the first appearance of infection was on the second day after labor. In five cases the onset was delayed until after the seventh day, and in one patient who died symptoms did not appear until the nineteenth day.

After infection developed one-half of these cases lived for two weeks, and a large number survived for three weeks or over. The earliest death was on the sixth day, while one patient perished forty days and one seventy-three days after the beginning of the disease.

Endometritis was the lesion most prominently found in these patients. Peritonitis was present in nine cases. In eight cases pus was found. Septic thrombosis of the uterine sinuses was present in six cases.

As complicating the septic infection a large proportion showed inflammatory changes in the intestine. Pneumonia, nephritis, diarrhœa, and delirium were the most frequent complications.

Fully one-half of the patients who recovered were suffering from parametritis. In six cases this advanced to suppuration. Five of them ruptured spontaneously, and one was evacuated by vaginal incision. As regards treatment, antiseptic intra-uterine douches were given twice daily and the uterus was well packed with iodoform gauze. Complications were treated as they arose, but without any routine plan. Serum treatment was negative in its results.

Pyosalpinx; Laparotomy in the Puerperal State.—In the *Edinburgh Medical Journal*, 1900, p. 124, MURRAY reports the case of a patient, a multipara, who had complained of profuse menstruation and debility. She had passed through one normal pregnancy and labor. During the second pregnancy she had pain in the left ovarian region, which was sometimes very severe. On one occasion this became so excruciating as to induce faintness. The patient's temperature was 101.5° F., and labor began. Parturition was delayed for several days, the patient suffering meantime with dull pain in the left side, and having a peculiar yellow complexion. Labor was finally terminated by forceps successfully.

Early on the morning of the second day after labor the patient was very ill with symptoms of abdominal septic infection. She was vomiting and greatly depressed. There was a distinct bulging and great pain on the left side of the vagina, near the cervix. The abdomen was opened as soon as possible and fresh adhesions found on the left side of the womb. The left tube and ovary were intensely congested and surrounded by fresh recent adhesions. The intestines were greatly distended. The left tube and ovary were ligated and removed; the right tube and ovary were found to be normal. The peritoneal cavity was washed out with several quarts of 1 per cent. lysol solution. There was no pus in the pelvis. The abdomen was closed without drainage and the uterine cavity was subsequently washed out with lysol solution. The womb contracted firmly. A copious enema was given after the operation. The patient made an uninterrupted recovery. On examining the amputated tube its canal was greatly distended. A small quantity of yellow purulent material was present in the tube.

The source of the original infection was not ascertained, but evidently it antedated both the patient's confinements.

Sudden Death After Labor.—In the *Edinburgh Medical Journal*, 1900, p. 135, PATERSON reports a case of sudden death following labor. The patient was a multipara, who when seen was suffering from great breathlessness, with frequent cough and expectoration of blood. On examining the chest coarse râles were heard all over it. The heart's action was so rapid that no murmurs could be heard. The patient was very cyanotic, and the pulse feeble, but regular. On the following morning the physician when sent for found the child and placenta born. The patient was sitting on the edge of the bed, being too breathless to lie down. The uterus was firmly contracted, and there was no hemorrhage. The patient was put to bed, and during the same afternoon grew rapidly worse. Bleeding was performed, with the injection of strychnine, which gave but temporary relief. The patient continued to fail, and died twenty-four hours after her labor.

The previous history showed that the patient had had during her pregnancy two attacks of impeded breathing, with expectoration of blood.

Upon autopsy the uterus was normal. There was an old endocarditis; the aortic valve was much thickened and covered with vegetations. The mitral valve was also thickened. Mitral and aortic stenoses were also present. The pulmonary vessels were healthy. The left kidney was completely cystic and contained tubercular pus.

The most reasonable diagnosis in this case at the time of the patient's illness was that which was made, namely, pulmonary embolism. This is a more frequent accident after labor than is death in cases of old endocarditis. The conditions after labor are favorable for the giving away of the heart. In either event treatment is exceedingly difficult and rarely successful.

Hepatic Toxæmia of Pregnancy.—In the *British Medical Journal*, 1900, p. 515, FOTHERGILL and STENHOUSE reported the case of a woman, aged thirty-two years, who developed great swelling of the legs and body when seven months pregnant. The urine became solid on boiling and contained a large quantity of bile. About one-third of a pint was passed daily. There was tenderness over the liver and increase in liver dulness. In spite of active treatment no improvement was observed. Abdominal dropsy gradually developed, and the stools were entirely without bile. Labor was finally induced, when the patient made a rapid recovery.

Puerperal Tetanus.—In the *Monatsschrift für Geburtshülfe und Gynäkologie*, 1900, Band xi., Heft 2, KENTMANN reports the case of a multipara who had a precipitate labor attended by hemorrhage. The patient was under the care of a midwife, who made no internal examination, but gave a vaginal douche. On the seventh day after delivery the patient noticed impairment in speech, followed gradually by pains in the back and stiffness in the limbs. Her symptoms seemed to resemble most those of hysteria. In a short time, however, the usual symptoms of tetanus appeared. The patient had pronounced opisthotonos; the lips were tightly drawn; the eyes half-opened, and the muscles strongly contracted. The temperature and pulse were normal. Early the next morning the reflexes were found greatly exaggerated, and swallowing became almost impossible. Under chloroform the uterus was thoroughly cleansed and a few fragments of decidua removed. Antitoxin was administered, given into the muscles of the back. Nothing, however, seemed to influence the progress of the disease, and the patient died of exhaustion. Kentmann reviews the literature of the subject and draws attention to the frequency of tetanus in tropical climates. It is proven that tetanus is a wound disease brought about through infection. The mortality rate of puerperal tetanus is estimated at from 60 to 80 per cent. So far as the etiology of the disease goes, its characteristic germ is commonly held to be the cause of the disease.

Retroflexion of the Pregnant Uterus, with Fistula of the Urachus.—UNTERBERGER (*Monatsschrift für Geburtshülfe und Gynäkologie*, 1900, Band xi., Heft 3) reports the case of a patient in early pregnancy who suffered from pain and fever, with disturbance in the functions of the bladder, and who finally had a discharge of urine through a fistula at the umbilicus. By vaginal examination it was found that the patient was about four months pregnant, and that the uterus was retroverted and sharply retroflexed. The abdomen was swollen, and the patient complained of almost entire failure to pass urine for a period of over a week.

The retroverted uterus had prevented the emptying of the bladder, which had become enormously stretched. The urachus had not been completely obliterated, and the bladder becoming adherent near the site of this duct, and adhesions taking place, a communication was established between the bladder and the urachus. It was not thought wise to attempt the immediate replacement of the womb nor to attempt to interfere with the fistula at the urachus. Accordingly the catheter was employed to empty the bladder very cautiously. After some days the discharge of urine at the umbilicus ceased, and it was found that the womb had risen considerably in the pelvis. It was finally possible to bring the uterus into almost normal condition by employing tampons. Abortion occurred, but the patient made an uninterrupted recovery. The bladder did not become infected in spite of the extraordinary retention of urine.

OPHTHALMOLOGY.

UNDER THE CHARGE OF
EDWARD JACKSON, A.M., M.D.,
OF DENVER,
AND
T. B. SCHNEIDEMAN, A.M., M.D.,
PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC.

The New Mydriatic, Euphthalmin.—A. DARIER (Paris) prefers a 5 or 10 per cent. solution of this drug to produce temporary dilatation of the pupil. Such a solution produces extreme mydriasis without causing any marked paresis of the accommodation. He compared the effect of the 5 per cent. solution of euphthalmin instilled in one eye with that of a 1 per cent. solution of homatropin instilled in the other eye. The dilatation produced in the two eyes was similar except that the homatropin acted a little more quickly. But in five to seven hours the mydriasis caused by the euphthalmin had disappeared, while that of the homatropin lasted until the following day.—*La Clinique Ophtalmologique*, No. 1, 1900.

[The value of euphthalmin as a brief mydriatic is now well-established, all observers being fully agreed regarding it. There is also complete agreement as to its freedom from danger of any injurious effect upon the cornea, such as strong solutions of cocaine are likely to produce. Regarding the risk of producing an outbreak of glaucoma with euphthalmin, while it is probably less than with any other mydriatic but cocaine, and most writers speak of it as *nil*, we must remember that every other new mydriatic has been put forward with the same assertion, but experience has in each previous case failed to substantiate the claim.]

Lachrymal Obstruction in the Young.—DONALD GUNN (London) reports seventeen cases, which he finds fall readily into two groups: 1st. Cases in which the obstruction was present at birth, or noticed soon after birth. 2d. Those cases in which for the first few years of life the child has been free from any suspicion of lachrymal obstruction, but later develops a lachrymal abscess.

The first group includes cases in which there is evidence of obstruction having been present at or before birth, the fluid in some cases being contained in a cavity which probably represents a dilated nasal duct; and cases in which the symptoms have arisen somewhat later, generally in association with conjunctivitis, but which, even if truly congenital in origin, show no evidence of a dilated duct.

The second group includes cases occurring in syphilitic children and often associated with interstitial keratitis; and cases in which the obstruction was caused by tubercular disease of the bones of the nose or orbit.

The congenital cases he finds are quickly cured by the passage of the probe, when the obstruction is formed of mucous membrane; but when it is cartilaginous the use of some form of style is needful. Gunn uses a stout lead wire, which he passes down the duct and brings out of the nostril, turning it at both ends to prevent slipping out of place. The cases dependent on bone disease are more obstinate, requiring local and general treatment.—*Ophthalmic Review*, February, 1900.

Cure of Pannus by Erysipelas.—S. Bäck (Gleiwitz) reports the case of a woman, aged twenty-two years, who had been for some time in the hospital undergoing treatment for trachoma with severe pannus. The lids had been rolled with Knapp's forceps and applications of copper employed, yet after four months there was still dense pannus. Facial erysipelas, with great swelling of the lids, occurred; and when, at the end of two weeks, the eyes could be opened again, great improvement in both the opacity and vascularity of both corneas had already occurred.—*Klinisches Monatsbl. f. Augenheilk.*, February, 1900.

Tuberculosis of the Conjunctiva.—J. W. H. Eyre (London) has encountered 11 cases of primary tuberculosis of the conjunctiva among 31,000 cases of eye disease. He thinks, therefore, that it is not so rare as has generally been supposed. It is usually unilateral. It occurs either as a caseating ulcer or as an inflammatory new formation of the granuloma type. Of the latter Eyre recognizes the four clinically distinct groups of Sattler.

It is extremely chronic and exhibits no tendency to undergo spontaneous cure. It does not usually tend to implicate the cornea until quite late in the disease, and the iris later still. The pre-auricular gland on the side of the affected eye is involved early, and next the glands below the angle of the jaw.

Removal of the primary focus, to prevent a general infection, should be carried out as early as possible, and should be thorough. Under such circumstances, as with other localized tuberculous lesions, a permanent cure may be confidently expected.

When the tubercular lesion is an ulcer the bacilli can generally be demonstrated in "scrapings" from it. But where it is a granuloma it is rather the exception to detect these organisms in sections of the tissue. Inoculation of the diseased tissue into the anterior chamber of the rabbit's eye, or into the subcutaneous tissue of a guinea-pig, is a better test of the character of the growth.—*Archives of Ophthalmology*, January, 1900.

Sympathetic Ophthalmia Treated by Sodium Salicylate.—H. Gifford (Omaha) reports three cases treated with this drug, which he recommends as the most important remedy for this disease. It should be given in very large doses. Thus, to a boy weighing 130 pounds he gave 180 grains in the twenty-four hours, giving it in 15-grain doses in a teaspoonful of brandy. In all of these cases the control of the drug over the inflammatory condition appears to have been very marked.—*Annals of Ophthalmology*, January, 1900.

Prolapse of the Iris after Simple Cataract Extraction.—George C. Harlan (Philadelphia) finds this is by no means so serious an accident as many authorities have considered it. Very small hernias of the iris may be let alone, unless they interfere with the closure of the wound. The best treatment for a large proportion of extensive prolapses is prompt abscission; though infective inflammation of the iris or conjunctiva may necessitate delay. In a certain number of cases the iris may be replaced, if septic or adhesive inflammation be absent.—*Ophthalmic Record*, February, 1900.

Corneal Lesions of Diplo-bacillus Conjunctivitis.—P. Petit (Paris), from an extended study of this subject concludes that while in the greater number of cases the diplo-bacillus infection is limited to the conjunctiva, it may involve the cornea, giving rise to ulceration, which, however, is usually slight. Such ulceration is most frequently situated near the margin of the cornea, is superficial without marked tendency to deepen; but it may, if not properly looked after, extend on the surface. The diplo-bacillus may be found in pure culture in the ulcer. He has found that a collyrium of

Zinc sulphate	1 part
Distilled water	40 parts

instilled once or twice daily has always effected a prompt and complete cure.—*Annales d'Oculistique*, February, 1900.

[In the formula given for the treatment of this form of conjunctivitis in the March number of this Journal, p. 369, there occurs a misprint. It should read:

Zinc chloride	4 parts.
Mercuric chloride	1 part.
Distilled water	4000 parts.

This is to be used every two hours.]

Tobacco Amblyopia.—E. Lopez (Havana), in reporting a case of this disease, remarks that it is rare in Cuba, amblyopia due to alcoholic indulgences being a more common form. This he ascribes largely to the quality of the tobacco generally used on the island. Lopez's patient, a man, aged forty years, improved rapidly upon suspending the use of tobacco and taking potassium iodide in increasing doses.—*Anales de Oftalmologia*, February, 1900.

Primary Glanders of the Conjunctiva.—Strzeminski (Wilna) reports a case of this kind occurring in a veterinarian who, although exposed to the disease, could not fix the date of infection. There was a nodule about the middle of the lower lid, and the adjoining conjunctiva was hyperæmic and slightly swollen. There was some mucopurulent discharge. The nodule was excised and examined microscopically, and showed the nature of the lesion. Its seat was then destroyed with the galvano-cautery, and there was no recurrence. Strzeminski thinks the rarity of conjunctival infection, as compared with infection of the nasal mucous membrane, is due to the removal of infective material by the movements of the lids.—*Recueil d'Ophtalmol.*, January, 1900.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF
W. T. COUNCILMAN, M.D.,
SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY,
AND
F. B. MALLORY, M.D.,
ASSISTANT PROFESSOR OF PATHOLOGICAL ANATOMY, HARVARD UNIVERSITY.

Investigations on Striated Muscle with Special Reference to Fatty Infiltration.—WALBAUM (*Virchow's Archiv.*, 1899, clviii., 170) concludes that fatty degeneration of striated muscle is uncommon and that fatty infiltration is very frequently met with.

As far as the condition of the muscles in rhachitis is concerned he finds that the older writers described microscopical conditions which they considered to be characteristic of this disease, while the later writers deny the existence of any such lesions. He gives a good bibliography.

He examined in all 119 cases of all kinds as they came to autopsy. Teased preparations were examined in all cases. He found that physiological saline solution alters the structure and volume of the fibres, and that ordinary tap water gives better results. Ordinarily hardened specimens were unsatisfactory, and specimens hardened in 10 per cent. formalin and stained with Sudan III. did not show as much fat as the fresh preparations used as controls.

In rhachitis the muscles showed no change macroscopically or microscopically. Between the flexors and extensors of the extremities no differences were observable, and he concludes that the deformities cannot be explained by changes in the muscles.

The fat in the muscle fibres was arranged in longitudinal rows. Cloudy swelling was present in only one case. The cross striation determined the size of the fat droplets. The presence of fat seemed to bear no relation to the state of nutrition, to the duration of the disease, or to the temperature. He could discover no factor which determined its presence.

Specimens were taken from the extremities, the thoracic muscles, the diaphragm, and the eye, for comparison. The levator palpebræ was most frequently fatty, then followed the other eye muscles; age seemed to have no influence, except that very little fat was found in cases under one year.

In association with the presence of fat there was no functional disturbance, no decrease in size, or apparent degeneration of the fibres, no destruction of or decrease in the number of nuclei, and no interstitial changes. Excluding the heart and diaphragm, the most active muscles, such as the levator palpebræ, contained most fat. The fat appears to be stored up in the tissues.

A New Method of Cultivating the Tubercle Bacillus.—W. HESSE (*Zeitschr. für Hygiene und Infectionskrankheiten*, 1899, xxxi.) has conducted experiments with plain agar-agar containing "Nährstoff Heyden" in place of peptone. He has demonstrated a growth of the tubercle bacillus within a period of five to six hours. In cultures from tuberculous sputa the growth is sufficient for the demonstration of the tubercle bacilli in smears before the growth of other bacteria has masked the conditions. The growth in this short period is shown by the fact that the bacilli in smears from the culture have twice the dimensions of those in smears from the sputum.

He recommends the following technique: Pour 20 c.c. of the medium into a Petri dish, capacity 9.5 cm. in diameter. After coagulation invert the dish, keeping it in this position in the subsequent manipulations. The sputum should be collected in a sterile glass dish. With a platinum-wire loop pick up a drop of the purulent mucus and rub it in a circle over the surface of the medium near the border of the dish. From this circle distribute twenty to thirty flakes of the mucus over the surface of the medium. Place the culture in the thermostat for twelve to twenty-four hours. Sterilize a cover-glass in the flame of a Bunsen burner and place it over the mouth of an open reagent bottle. Remove the cover of the Petri dish and bring one of the flakes of mucus in contact with the cover-glass. Remove the latter by introducing a platinum wire loop under one edge, tipping the dish toward that edge. The cover-glass will then remain hanging by the opposite edge, and may be removed with forceps. If the flake of mucus does not attach itself to the cover-glass touch the latter with a hot platinum-wire loop at the point where it is in contact with the mucus, in order to melt the medium slightly. Cultures should be kept in a moist chamber.

He gives the composition of the medium as follows:

Nährstoff Heyden	5 grammes.
Salt	5 "
Glycerin	30 "
Agar-agar	10 "
Normal sod. hydrate sol.	5 c.c.
Distilled water	1000 c.c.

The "Nährstoff Heyden" should be dissolved in a little water. After the other ingredients have boiled for about two hours it should be added and the boiling continued fifteen minutes longer. Filter.

Hesse considers the method superior to the inoculation test in many cases.

If the method will enable one easily to find the tubercle bacillus in the "purulent mucus" of tuberculous sputa, in which no caseous masses are present, it will be of much practical value.

Termination of Pneumonia in Induration.—RIBBERT (*Virchow's Archiv.*, 1899, Band clvi. p. 164) notes that in the recent studies upon organizing pneumonia, the place of origin of the vascular connective tissue that fills the air-spaces has been much discussed. Three views are held: that it originates from (1) the alveolar wall; (2) the subpleural and interlobular tissue; (3) the bronchioles and smaller bronchi. The first is the oldest and is probably most commonly accepted. v. Kahlden and Borrmann are its latest supporters. Ribbert opposes it. He shows that the organization begins as an outgrowth from the connective tissue in the walls of the smallest bronchi and bronchioles, especially the latter, and grows peripherally into the alveoli. So long as the organization is not complete, the formation of new tissue is always furthest advanced in the bronchioles and bronchi; sometimes there is no connective tissue in the alveoli. He does not deny that when there is marked distention of the alveoli with fibrin the alveolar wall might possibly be the source of the connective tissue, but he has never observed it. If one is to determine whether the organization begins by outgrowths from the alveoli, only the early stages must be selected for study. A connection of the organizing exudate with the alveolar wall in the later stages proves nothing. The secondary union is very extensive. The alveolar spaces may be entirely obliterated.

Hansemann has shown that there are fine openings in the normal alveolar wall. In pneumonia, fibrin threads are found passing through these and connecting the fibrin meshwork in adjacent alveoli. The vessels and cells that replace the fibrin-plugs follow the course of the fibrin threads through the alveolar wall. In ordinary microscopical preparations they appear to originate from the alveolar wall, which they really only perforate. Ribbert employed injected preparations and his modification of Mallory's phosphomolybdic acid hæmatoxylin stain.

The numerous strands connecting the alveolar plugs could be seen passing through the wall above and below the vessels and at right angles to them. A genetic connection could be readily excluded. Doubtless the proliferating cells cause the pores to dilate. Hence, quite a large strand may pass from one alveolus to another.

The masses of connective tissue in the bronchioles contained many vessels. They were often of large size and ran longitudinally. The alveolar plugs, almost without exception, contained no vessels.

Notice to Contributors.—All communications intended for insertion in the Original Department of this Journal are received only *with the distinct understanding that they are contributed exclusively to this Journal.*

Contributions from abroad written in a foreign language, if on examination they are found desirable for this Journal, will be translated at its expense.

Liberal compensation is made for articles used. A limited number of reprints in pamphlet form, if desired, will be furnished to authors in lieu of compensation, *provided the request for them be written on the manuscript.*

All communications should be addressed to

DR. ALFRED STENGEL, 1811 Spruce Street, Philadelphia, U. S. A.
Or
DR. HECTOR MACKENZIE, 59 Welbeck St., Cavendish Sq., London, W., Eng.

INDEX.

ABDOMINAL cavity, foreign bodies in, 486
  hysterectomy for cancer of uterus, 360
  palpitation, treatment of, 483
  wall, tumors of, 734
Abscess, arterial, 348
  orbital, 369
Accessory thyroid-gland tumors in base of tongue, 241
Accidental hemorrhage, 239
Accommodation, influence of, on intraocular pressure, 117
  in lower animals, 118
  theory of, 117
Acne urticata, 120
Acoin, 732
Action upon the renal function of hypnotics associated with diuretics, 612
Acute articular rheumatism and chorea, relation between, 225
  disease, salt water infusion in, 479
    subcutaneous injection of salt solution in, 471
  disseminated miliary tuberculosis of skin, 119
  general septic peritonitis, treatment of, by continuous irrigation with warm normal salt solution, 477
  infection of umbilical origin, 110
  otitis media, prophylaxis of, 114
  puerperal sepsis, surgical treatment of, 140
Addison's disease, suprarenal extract in, 729
Adenomyoma of round ligaments and posterior vaginal wall, 733
  of uterus and tubes, 362
Adenomyomata of uterus, 281
Agorophobia caused by aural lesions, 116
Alcaptonuria, contribution to study of, 461
Alopecia areata, new agent for treatment of, 120
    two epidemics, of, in an asylum for girls, 243
Amblyopia, tobacco, 741
Amputation of cervix uteri, effect of, on pregnancy and labor, 488
Amygdalitis, 241
Anæmia, extreme, in pregnancy, 366
  pernicious, 718
  splenic, 54
Anæsthesia, local, in radical cure of hernia, 465
Anæsthetic prurigo as a symptom of chronic alcoholic intoxication, 495
Aneurism of aorta in a child, 601
  thoracic, 414
  treated by subcutaneous gelatin injections, 603
Aneurisms, treatment of, with gelatin injection, 231
Angina and rheumatism, 90
Angiotripsy, 361
Anterior ethmoidal cells, anatomy of, 624
Antero-posterior positions of the head as a cause of difficult labor, 492
Antiphthisic serum in tuberculosis, 476
Antisepsis, gastro-intestinal, 608
  intestinal, 356
Antistreptococcic serum in puerperal septicæmia and pelvic cellulitis, 726
Antitoxin, dry, 726
Aortic aneurism, tracheal shock in, 10
Appendicitis, diagnosis of, 345
Arctic regions, bacteria in, 501
Arneill, J. R., the Ehrlich diazo reaction, 296
Arsenic, value of, in dermatitis herpetiformis, 244
Arteritis in the young, 463
Artificial serum, grave infection treated by, 478
Aspirin, 727
Ataxia, permanent non-progressive, 657
Atmocausis and zestocausis, 618
Attic suppurations, 374
Autumnal diarrhœa in cities, 123

BACKHAUS' milk, composition of, for infant feeding, 601
Bacteria in arctic regions, 501
  found in puerperal uterus, 112
Bactericidal action of tears, 369
Bacteriological-clinical complications in acute and chronic suppurations in middle ear, 370
  study of bile, 496

Bedbugs and fleas as agents in the spread of disease, 248
Bladder, plastic operations on, 349
  tetany of, 725
Blastomycetic dermatitis, 121
    engrafted on syphilitic ulcers, 494
Blood, changes in, in latent malaria, 340
  heated, in treatment of croupous pneumonia, 477
  human, color-strength and iron of, 587
Blumer, G. B., report of a family outbreak of trichinosis, 14
Bradford, E. H., surgical anatomy of congenital dislocation of hip-joint, 629
Brain, removal of bullet from, 346
Braun's hook, decapitation with, 735
Bromoform, 604
Bronchitis, senile, 520
Bronchopneumonia in children, treatment of, 482, 725
Broncho-pulmonary affections, acute, treatment of, 607
Brow presentations, 616
Brown, S., permanent non-progressive ataxia, 657
Bullet, removal of, that had been three years and seven months in brain, 346
Bullets, location of, by X-rays, 349

CABOT, R. C, a remarkable case of probable thoracic aneurism presenting intermittently through the sternum, 414
Cacodylic acid, therapy of, 605
Cæcum, tuberculosis of, 668
Cæsarean section and symphysiotomy, 111
    in septic cases, 112
    with transverse incision of fundus, 615
Calculous cholecystitis, surgical intervention in, 350
Calmette's antivenomous serum in treatment of leprosy, 731
Calves, transmission of syphilis to, 420
Cancer, experimental production of, 247
  gastric, treatment of, 220
  increasing prevalence of, 170
  of stomach, 585
  of urethra in female, 361
  of uterus, 360, 487
Cantharides as a hæmostatic in hæmaturia, 103
Carbolic acid, 355
    poisoning due to absorption by the skin, 721
Cardiac asthenia of pneumonia, treatment of, 480
Castration, influence of, on the general system, 108
Catarrhal otitis media, chronic, 426
Cell inclusions in carcinomata and their relation to the blastomycetes, 246
Cerebro-spinal fever, Kernig's sign in, 99
  meningitis complicating measles, 224
Chadbourne, T. L., case of tricuspid and mitral stenosis with adherent pericardium, 306
Chloretone a safe hypnotic, 613
Choledochotomy without suture, 344
Chorea, etiology of, 724
  sodium sulphocarbolate in, 727
Cinchonidine and Wrightia antidysenterica, 474
Circulation, regulation of, 214
Cirrhosis of liver, 263
Clark, J. G., a critical summary of recent literature on gonorrhœa in women, 73, 436
Clemow, F. G., clinical aspects of plague, 391, 547
Climacteric neuroses, 106
Clinical aspects of plague, 391, 547
Cœliotomy, direct ligation of vessels in, 107
Coitus, injuries during, 621
Colocynth poisoning, 479
Color-strength and iron of human blood, 587
Coloring matters, use of, in tracing pollution of water supplies, 499
Colporrhaphy, modification of Hegar's method of, 487
Conditions favoring the passage of soluble substances between mother and fœtus, 615
Congenital dislocation of hip-joint, 629
  myxœdema, 341
Conjunctiva, primary glanders of, 741
  tuberculosis of, 749
Conjunctivitis, argentamin for, 369
Cornea, ulcer of, 367
Corneal lesions of diplo-bacillus conjunctivitis, 741
  ulcers, holocain for, 118
Corpus luteum, 619
Corrosive sublimate, intravenous injection of, 728
Crafts, L. M., a fifth case of family periodic paralysis, 651
Creosote-carbonates, 102
Cresols, disinfectant action of, 103

Crowder, T. R., pathology of chronic hyperplastic tuberculosis of the cæcum, based upon the study of two cases, in one of which carcinoma of the cæcum coexisted, 668
Crural hernia, 469
  veins, thrombosis of, 236
Cubitus valgus femininus, 347
Curettement, dangers of, 732
Cyst of a supernumerary ovary, 234
Cystic perithelioma of ovary, 617
Cystinuria and its relation to diaminuria, 39
Cystocele, Freund's operation for, 484
Cysts of tonsils, 241

DANA, C. A., pathological anatomy of cord in paralysis agitans and senility, 667
Davis, E. P., differential diagnosis of ectopic gestation, 539
Deafness, influence of heredity on, 184
Decapitation with Braun's hook, 735
Dermatitis herpetiformis, value of arsenic in, 244
Dermoid tumor of third ovary, 235
  tumors of ovary, 733
Detection of horsemeat in sausages, 124
Diabetes, influence of, on female genital organs, 488
  mellitus, 358
    acute, supervening in a case of diabetes insipidus, 213
  saccharine, in an infant, 353
Diarrhœa, autumnal, 123
Diastasis of symphysis pubis, congenital, 365
Diet in typhoid fever, 610
Dilatation of stomach, 125
    after traumatism, 586
Dionin, 481
  as an analgesic, 728
Diphtheria, observations on, 233
  oil of turpentine in treatment of, 731
  treatment of, 608
Diplo-bacillus conjunctivitis, 368
Diseased animals, concerning the use of meat from, 249
Disinfectant action of cresols, 103
Disinfection, surgical, 595
Diverticula, diagnosis of, 377
Drainage and peritonitis, 617
Drinking water, typhoid bacilli in, 501
    zinc as a normal constituent of, 250
Drugs in cardiac insufficiency, 473
Dry antitoxin, 726
Duel, A. B., value of electrolytic dilatation of the Eustachian tubes in chronic tubal catarrh and chronic catarrhal otitis media, 426
Dysentery and malaria, prophylactics against, 474
Dysentery, etiology of, 598

EAR disease, epilepsy from, 373
  Eclampsia followed by toxæmia in a succeeding pregnancy, with the death of the ovum, 613
  treatment of, by saline infusion, 736
Ecthyma grangrænosum, etiology of, 494
Ectopic gestation complicated by tuberculosis and by gonorrhœa, 110
    differential diagnosis of, 539
Eels, toxalbumin in flesh of, 501
Ehrlich diazo reaction, 296
Elastic tissue in normal and pathological organs, 626
Electrolytic dilatation, value of, 426
Elting, A. W., the acute pneumonic form of tuberculosis, 509
Embryonal renal adenosarcoma, 693
Endocarditis, 93
  malignant, 214
  occurring in the course of tonsillitis, 1
Endometritis, senile, 109
Enteric fever, antityphoid serum in treatment of, 477
Epilepsy from ear disease, 373
Epithelioma, multiple, developing upon lupus erythematosis, 493
Erosion of tonsil following scarlatina, 227
Erysipelas, mercurial ointment in, 729
Erytheme induré des scrofuleux of Bazin, 495
Ethyl bromide an anæsthetic in minor surgery, 478
Euphthalmin, 602
  a new mydriatic, 739
Excretion of methylene blue in normal and pathological kidneys, 339
Extirpation of septic puerperal uterus, 237
  of stomach, total, 220
  of uterus and bladder, 236
Eye, diseases of, suprarenal extract in, 729
Eyes and teeth, pathological relations of, 367

FACIAL spasm and its relation to errors of refraction, 33
Fallopian tube, papillary tumors of, 486

Fallopian tubes, torsion of, 363
Family periodic paralysis, 651
        case of, 160
Fever, treatment of, following delivery, 489
Fibrolipoma of tonsil, 623
Finsen's phototherapy, 242
Flies, transmission of infection by, 502
Fœtal head, indentation of, by the sacropromontory, 614
Follicular pharyngitis, 240
Foreign bodies in abdominal cavity, 486
Formaldehyde as a milk preservative, 226
    disinfection, 123
Fracture of patella, 223
Fractures of spinal column, 346
Francine, A. P., two cases of tabes dorsalis in negroes, 543
Frank's method in gastrostomy, 595
Frazier, C. H., a critical summary of the literature of surgery of the stomach, 565
Freund's operation for cystocele, 484
Frontal sinus, anatomy of, 624

GALL-BLADDER infections, observations upon the origin of, 89
Gangrenous dermatitis complicating typhoid fever, 251
Gasserian ganglion, operations on, by Hartley-Krause method, 597
Gastric cancer, treatment of, 220
    diseases, secretion of pepsin in, 586
    hemorrhage, treatment of, 101
Gastroplication for dilated stomach, 95
Gastro-enterostomy, technique of, 221
    -intestinal and scrotal hemorrhages in an infant one month old, 101
        antisepsis, 608
        hemorrhage, 263
Gastrostomy by Frank's method, 595
Gelatinous form of sodium biurate, 342
Geographical tongue in childhood, 352
Gestation, ectopic, differential diagnosis of, 539
    tubal and abdominal, 239
Glanders, primary, of conjunctiva, 741
Glandular hypertrophy of cervix simulating carcinoma, 235
Goitre, etiology of, 588
Gonorrhœa in women, 73, 436
    treatment of, 105
Gout, experimental contribution to study of, 343
        study in, 459
    treatment of, 342
Granular degeneration of red blood-cells, 343
Granules, staining of, in leucocytes, 375
Grave infection treated by artificial serum, 478
Graves' disease, symmetrical areas of solid œdema occurring in, 622
Guaiacol-carbonates, 102
Guiamar, physiological action and therapeutics of, 229
Gumma of iris and ciliary body, 423
Gynecology, salipyrin in, 362

HÆMATURIA, surgical treatment of, 347
    terminal, 597
Hæmochromatosis, case of, 627
Hæmophilia, 227
    in the negro, 717
Hall, J. N., tracheal diastolic shock in the diagnosis of aortic aneurism, 10
Hartley-Krause method of operating on Gasserian ganglion, 597
Headaches and their treatment, 358
Heart, wounds of, 218
Hegar's method of colporrhaphy, modification of, 487
Hemorrhage, accidental, 239
    from gastric ulcers, 95
    primary, following amygdalotomy, 623
    post-partum, 109
Hepatic toxæmia of pregnancy, 737
Hereditary deafness, 184
Hernia, crural, radical operation in, 469
    in female, internal or direct, 467
    inguinal, in infants, 468
        radical operation of, in children, 470
    local anæsthesia in radical cure of, 465
    umbilical, treatment of, 468
Heroine, the therapeutics of, 604
Hirst, J. C., histology and histological diagnosis of adenomyomata of uterus, 281
Herzog, M., embryonal renal adenosarcoma, 693
Hip-joint, congenital dislocation of, 629
Histogenesis of peripheral nerves, 376
Holocain for corneal ulcers, 118
Horsemeat in sausages, detection of, 124
Hospital contagion of typhoid fever, 351
Hot-air treatment of disease, 730
Hour-glass stomach, 91
Hydramnion in cases of homologous twins, 113
Hydrocephalus and hypoplasia of the suprarenals, 246

Hyperpyrexia, puerperal, 239
Hysterectomy, 140
  subperitoneal, 362

ICE tampons in treatment of prolapsus ani, 226
Ichthalbin, 611
Ichthyol-vasogen, use of, in diseases of joints, 612
Ileus after abdominal section, 732
  after laparotomy, 484
Incontinence of urine, operation for, 235
Increasing prevalence of cancer as shown in the mortality statistics of American cities, 170
Influence of heredity on deafness, 184
Influenza, rose spots in, 120
Inguinal hernia in infants, radical cure of, 468
Injuries during coitus, 621
Inoperable carcinoma, palliative treatment of, 107
  carcinoma, treatment of, by calcium carbide, 233
  epithelioma of larynx and neck treated with formalin injections, 104
Internal secretions and the regulation of the circulation, 214
Interstitial nephritis, chronic, 463
    in which dermatitis exfoliativa supervened, 494
Intestinal anastomosis, a new invagination method of, 219
  antiseptics, 356
  obstruction due to uterine fibroids, 619
Intestine, laceration of, with rupture of mesenteric artery without a skin wound, 467
Intraligamentary tumors, treatment of, 618
Intraperitoneal infusion of saline solution, 486
Intra-uterine amputation in an upper extremity by amniotic bands, 735
Intravaginal fixation of prolapsed uterus, 108
Inversion, chronic, conservative treatment of, 108
  of uterus, 111
    by neoplasms, 360
Iodopyrin, therapeutic uses of, 481
Iris, gumma of, 423
  prolapse of, after simple cataract extraction, 741

JUNG, F. A. R., a contribution to the diagnosis of diverticula in the lower part of the œsophagus, 377
Justus blood-test for syphilis, 715

KAKODYLATE of sodium in psoriasis, 244
Keen, W. W., case of multiple neuro-fibromata of ulnar nerve, 526
Keloid treated by electrolysis, 244
Kernig's sign in cerebro-spinal fever, 99
Kidney, structure and function of, 97
  tuberculous disease of, 591

LABOR complicated by posterior rotation of the chin terminated successfully by forceps, 492
  missed, 490
  sudden death after, 737
Lachrymal obstruction in young, 739
Laparotomy in puerperal state, 736
Larynx, spontaneous retrocession of a presumptive malignant growth of, 624
Latent fever in chronic tuberculosis, 215
  malaria, changes in blood in, 340
Lens, reclination of, 119
Leprosy, treatment of, by hypodermatic injections of chaulmoogra oil, 243
  treatment of, 731
Leucocytes, reaction of, to guaiac, 590
  staining of granules in, 375
Leucocytosis in whooping-cough, 599
Leukæmic lesions of skin, 459
Lewis, D., embryonal adenosarcoma, 693
Lichen scrofulosorum in the negro, 621
Lipomyoma of uterus, 488
Liquid air, its application in medicine and surgery, 730
Liver, cirrhosis of, 263
  lesions of, in young children, 722
Liver-cell in jaundice, changes in, 497
Lower animals, accommodation in, 118

McCARTHY, D. J., narcolepsy, a contribution to the pathology of sleep, 178
Malaria, guaiacol in treatment of, 728
  quinine in, 474
Malarial fever, multiple gangrene in, 720
  prophylaxis, fluid extract of lemon in, 603
Malignant endocarditis, 214
Massey, G. B., increasing prevalence of cancer as shown in the mortality statistics of American cities, 170
Mast-cells, 705

Mastoid operations in chronic purulent otitis media, 116
  process, osteoplastic operation on, 222
Measles, pathology of, 472
  second attack of, 472
  suffocative laryngitis at beginning of, 472
Meat, use of, from diseased animals, 249
Meat poisoning, 500
Meats, oil as a preservative of, 248
Melæna neonatorum, treatment of, 357
Menopause, influence of, on cardiac lesions, 488
Menstruation, periodical delirium during, 233
  and pulmonary tuberculosis, relation between, 619
Mercury, elimination of, by mammary gland, 471
Metabolism after removal of ovaries, 361
Metastatic embryonal glandular tumors in region of kidney in children, 245
Methylene-blue, 231
Metrorrhagia of ovarian origin, 235
Middle ear in tuberculosis, 115
Migraine in epilepsy, 24
Military surgery, xeroform in, 728
Milk preservative, formaldehyde as a, 226
Minor surgery, ethyl bromide an anæsthetic in, 478
Mobility of tumors, 486
Modern surgery, shock in, 219
Molluscum contagiosum, lesion of, 243
Morse, J. L., an analysis of fifty-one cases of pneumothorax, 503
Multiple neuro-fibromata of ulnar nerve, 526
Musser, J. H., dilatation of the stomach, 125
Myocarditis, chronic, with cardiac aneurism in a child, 589
Myoidema in pulmonary tuberculosis, 458
Myoma of uterus, 364
Myomata of uterus, histogenesis of, 498
Myxodema, congenital, 341
  treated with colloid material, 610
Myxomatous degeneration of fibroids, 487

NAPHTALIN and oxyuris vermicularis, 603
Narcolepsy, 178
Nasal cavity, thyroid-gland metastasis in, 242
Negroes, tabes dorsalis in, 543
Nephritis, family, 463
Nervous diseases, treatment of, 231
Neuman, L. H., report of a family outbreak of trichinosis, 14
Neuritis, tuberculous, 343
Neuro-fibromata, multiple, of ulnar nerve, 526
Nichols, E H., surgical anatomy of congenital dislocation of hip-joint, 629
Nocturnal enuresis, relation between, and adenoid vegetations, 352
Nonne, M., spinal-cord changes in paralysis agitans, 665

OCCLUSION of tubes by ligature, 360
Œdema of lung, acute, after thoracocentesis, 588
Œsophageal dilatations, 377
Œsophagus, foreign body in, 240
  rare ulceration of, in typhoid fever, 624
  stenosis of, 240
Oil as a preservative of meats, 248
Oliver, C. A., gumma of iris and ciliary body, 423
  traumatic varix of orbit in which ligation of left common carotid artery was successfully performed, 292
Orbit, traumatic varix of, 292
Orbital abscess of dental origin, 369
Osler, W., on splenic anæmia, 54
Osteoplastic operation on mastoid process, 222
Ovarian opotherapy, 233
Ovaries, changes in, during pregnancy, 106
  removal of, 361
  transplantation of, 234
Ovary, calcareous deposits in, 107
  cyst of, 625
  cystic perithelioma of, 617
  dermoid tumors of, 733
  papillary cystomata of, 733
  supernumerary, cyst of, 234
  third, dermoid tumor of, 235

PACKARD, F. A., endocarditis occurring in the course of tonsillitis, 1
Pannus, cure of, by erysipelas, 740
Papillary cystomata of ovary, 733
  tumors of the Fallopian tube, 486
Papillectomy, renal, 593
Paracentesis of membrana, 114
Paralysis agitans and senility, pathological anatomy of cord in, 667
    spinal-cord changes in, 665
    traumatic, 92
  family periodic, a fifth case of, 651
  traumatic, of shoulder and arm, 222

Parkinson's syndrome in childhood, 100
Patella, fracture of, suture of fibrous capsule in, 223
Pendent growths of tonsil, 241
Pepsin, secretion of, in gastric diseases, 586
Pericardium, wounds of, 218
Perihepatitis, chronic hyperplastic, 457
Perineal resection of rectum for carcinoma, 346
Periodic paralysis, a case of family, 160
Periodical delirium during menstruation, 233
Peripheral nerves, histogenesis of, 376
Peritoneal adhesions, 485
Peritoneo-pericardial or pseudo-pericardial peritoneal friction, 339
Peritonitis, diffuse, drainage in cases of, 464
  general, new method of treating, 464
Peritonsillar abscess with diphtheria, 241
Permanent non-progressive ataxia, 657
Pernicious anæmia, further observations on, 718
Pertussis, treatment of, 477
Pharmaceutical notes, 622
Phototherapy, Finsen's, 242
Phthisis treated by epidermic application of guaiacol, 229
Placenta, adhesion of, to fœtal head, 111
Plague bacillus, action of soil on, 249
  clinical aspects of, 391, 547
  treatment of, 354
Plantar aponeurosis, retraction of, 94
Plasma-cells, 374
  and mast-cells, 702
Plastic operations on bladder, 349
  vs. shortening of the round ligaments in prolapsus, 361
Pneumonia, croupous, heated blood in treatment of, 477
  in induration, termination of, 743
  treatment of, 607
Pneumonic form of tuberculosis, 509
Pneumothorax, an analysis of fifty-one cases of, 503
Poisoning by colocynth, 479
  by sulphonal or trional, 479
Porokeratosis, eleven cases of, in one family, 120
Post-partum hemorrhage, 109
Posterior Y-shaped gastro-enterostomy, advantages of, 345
Poultices, a substitute for, 475
Preble, R. B., conclusions based on sixty cases of fatal gastro-intestinal hemorrhage due to cirrhosis of the liver, 263
Pregnancy and myoma of uterus, 364
  early diagnosis of, 615
Presentation, brow, 616
Projectile, modern small-bore, surgical aspects of, 466
Prolapsus ani, treatment of, by ice tampons, 226
  uteri, radical operation for, 621
Protargol in gonorrhœa, 609
Proteolytic bacteria of milk, pathogenic action of, 600
Psoriasis and glycosuria, 496
  kakodylate of sodium in, 244
Puerperal fever and antistreptococcic serum, 608
    clinical study of, 333
    hyperpyrexia, 239
  septic infection, 736
  tetanus, 738
Pulmonary tuberculosis treated by aniline inhalations, 606
    treatment of, 228
Purulent metritis, non puerperal, 620
Putnam, J. J., family periodic paralysis, case of, 160
Pyelonephritis complicating pregnancy, 616
Pyosalpinx, 736

QUININE in malaria, 474

RAVENEL, M. P., an experiment in the transmission of syphilis to calves, 420
Rectal carcinoma during pregnancy, 614
Rectum, resection of, for carcinoma, 346
Red blood-cells, degeneration of, 343
Relation of migraine to epilepsy, 24
Renal papillectomy, 593
Resection of cervical portion of œsophagus for carcinoma, 94
Restoration of entire tibiæ necrotic from acute osteomyelitis, 96
Rest or work, influence of, upon the development of fœtus in utero, 490
Retention of urine, partial, 217
Retraction of the plantar aponeurosis, 94
Retroperitoneal sarcoma, 311
Retroflexion of pregnant uterus, 738
  surgical treatment of, 236
Reviews—
  Barker, the Nervous System and its Constituent Neurons, 578
  Bloodgood, Operations on 459 Cases of Hernia in the Johns Hopkins Hospital, 454

Reviews—
  Chapman, Treatise on Human Physiology, 84
  Clouston, Clinical Lectures on Mental Diseases, 209
  Coakley, Diseases of the Nose and Throat, 449
  Crook, Mineral Waters of the United States and their Therapeutic Uses, 87
  Duane, Text-book of Ophthalmology, 88
  Edinger, Anatomy of the Central Nervous System of Man and of Vertebrates in General, 578
  Friedrich, Rhinology, Laryngology, and Otology in their Relation to General Medicine, 330
  Fuchs, Text-book of Ophthalmology, 88
  Gibson, Diseases of the Heart and Aorta, 451
  Gordinier, Anatomy of the Central Nervous System, 578
  Gumprecht, Technics of Special Therapy, 713
  Hardin, Rise and Development of the Liquefaction of Gases, 204
  Hare, Progressive Medicine, Vol. III., 1899, 210
  Hayden, Manual of Venereal Diseases, 86
  Heisler, Text-book of Embryology, 710
  International Medical Annual and Practitioners' Index, 206
  Jackson, Ready Reference Hand-book of Diseases of the Skin, 338
  Keen and White, American Text-book of Surgery, 331
  Korschelt and Heider, Text-book of the Embryology of Invertebrates, 710
  Kyle, Diseases of Nose and Throat, 450
  Le Dentu and Delbet, Traité de Chirurgie clinique et operatoire, 584
  Lee, General Physiology, 82
  Lewis, Text-book of Mental Diseases, 207
  Malsbary, Practice of Medicine, 456
  Musser, Practical Treatise on Medical Diagnosis for Students and Physicians, 327
  Nancrede, Lectures upon the Principles of Surgery, 331
  Novy, Laboratory Work in Bacteriology, 208

Reviews—
  Park, Treatise on Surgery by American Authors, 331
  Platt, A Contribution to the Surgery of Fractures and Dislocations of the Upper Extremity, 453
  Quénu and Hartmann, Chirurgie du Rectum, 583
  Roberts, a Manual of Modern Surgery, 714
  Roberts, Notes on the Modern Treatment of Fractures, 453
  Schleif, Materia Medica, Therapeutics, Medical Pharmacy, Prescription Writing, and Medical Latin, 205
  Scott, Sexual Instinct, its Use and Dangers as Affecting Heredity and Morals, 337
  Smith, Introduction to the outlines of the Principles of Differential Diagnosis, with Clinical Memoranda, 327
  Terrier and Baudouin, Suture of the Intestine, 201
  Transactions of the American Microscopical Society, 206
  Vecki, Pathology and Treatment of Sexual Impotence, 337
  Verhorn, General Physiology, 82
  Wharton and Curtis, The Practice of Surgery, 331
Rhachitis, treatment of, by suprarenal extract, 226
Rheumatism and angina, 90
Rhinopharyngeal vascular growth, 625
Roosevelt Hospital, typhoid fever at, 354
Rose-spots in influenza, 120
Rupture of uterus at full term, 490

SALINE solutions, injection of, 484
  Salipyrin in gynecology, 362
Salt water infusion in acute disease, 479
Sanarelli's anti-amarylic serum, 105
Sarcoma, retroperitoneal, 311
  of tongue, primary, 221
  of uveal tract, 368
Scarlet fever, a clinical study of lymphatic glands in cases of, 723
Sausages, detection of horsemeat in, 124
Scheppegrell, W., a critical summary of literature on the influence of heredity on deafness, 184
Sciatic sclerosis, so-called, 96
Sclerema neonatorum, 495
Scleritis and episcleritis, treatment of, 118
Scorbutus, iodine in treatment of, 230

Scurvy-rickets in a boy of twelve years, 600
Seborrhœic eczema of face, resorcin-alcohol in treatment of, 119
Senile bronchitis, 520
  endometritis, 109
Septic infection, avenues of, in new-born, 366
Septicæmia and antistreptococcic serum, 608
  treated with normal salt solution, 610
Serotherapy in tuberculosis, 605
Serpiginous ulcer of cornea, treatment of, 367
Shock in modern surgery, 219
Shoulder and arm, traumatic paralysis of, 222
Simon, C. E., cystinuria and its relation to diaminuria, 39
Skin, alterations of, occurring in lymphatic leukæmia and pseudoleukæmia, 493
  leukæmic lesions of, 459
Sodium biurate, gelatinous form of, 342
Solvent action of certain British and foreign mineral waters on sodium biurate, 727
Spasm, facial, 33
Spiller, W. G., case of multiple neurofibromata of ulnar nerve, 526
  relation of migraine to epilepsy, 24
Spinal-cord changes in paralysis agitans, 665
  column, fractures of, 346
Spirillum in false membrane on tonsil, 623
Splenic anæmia, 54
Spleno-myelogenous leukæmia, 716
Stahl, B. F., gangrenous dermatitis complicating typhoid fever, 251
Steele, J. D., a critical summary of the literature on retroperitoneal sarcoma, 311
  dilatation of the stomach, 125
Stenosis of œsophagus, 240
Sterility, common form of, 362
Stevens, E. W., facial spasm and its relation to errors of refraction, 33
Stiffness, chronic, of vertebral column, 211
Stomach, cancer of, 585
  dilatation of, 125
    after traumatism, 586
  hour-glass, 91
  surgery of, 565
Streptococci, various sorts of, and their action in disease, 365
Striated muscle, investigations on, with reference to fatty infiltration, 742
Strophanthus, 357
Subperitoneal hysterectomy, 362
Sulphonal or trional, poisoning by, 479
Superfœtation, case of, 735
Suppurative inflammation in eyes of newborn, treatment of, 491
Suprarenal extract in surgery, 230
Surgery of stomach, 565
  suprarenal extract in, 230
Surgical aspects of the modern small-bore projectile, 466
  disinfection, 595
  interference, wisdom of, in hæmatemesis and melæna for gastric and duodenal ulcer, 221, 469
  treatment of retroflexion, 236
Suture of fibrous capsule in fracture of patella, 223
  of fractured patella by an improved method, 594
Syphilis, treatment of, 609
Sympathetic ophthalmia treated by sodium salicylate, 740
Symphysiotomy and Cæsarean section, comparison of results of, 364
Syphilis, Justus blood-test for, 715

TABES dorsalis in negroes, 543
Tannigen, 605
Tears, bactericidal action of, 369
Technique of gastro-enterostomy, 221
Tenalin, 476
Terminal hæmaturia, 597
Tetanus, puerperal, 738
  treated with antitoxin, 105
Tetany of bladder, 725
  simulating tetanus, 225
Therapeutics, past, present, and future of, 232
Thoracic aneurism, 414
Thrombosis of crural veins after operation, 236
Thyroid-gland metastasis in nasal cavity, 242
Tobacco amblyopia, 741
Tongue, base of, accessory thyroid-gland tumors in, 241
  geographical, in childhood, 352
  sarcoma of, 221
Tonsil, erosion of, 227
  fibrolipoma of, 623
  pendent growths of, 241
Tonsils, cysts of, 241
Toothache from insufficiency of internal recti muscles, 368
Torsion of Fallopian tubes, 363

Toxalbumin in flesh of eels, 501
Tracheal diastolic shock in the diagnosis of aortic aneurism, 10
Transmission of infection by flies, 502
    of syphilis to calves, 420
Transplantation of ovaries, 234
Traumatic fracture of spinal column, 346
    paralysis agitans, 92
    varix of orbit, 292
Trichinosis, report of a family outbreak of, 14
Tricuspid and mitral stenosis with adherent pericardium, 306
Tubal and abdominal gestation, 239
Tubercle bacillus, a new method of cultivating, 742
Tubercular infection, possibility of, through milk, butter, and oleomargarine, 121
Tuberculosis, acute pneumonic form of, 509
    of cæcum, 668
    in childhood, 100
    chronic, latent fever in, 215
    of conjunctiva, 740
    cutis propria, 622
    serotherapy in, 605
    of uterus, 733
Tuberculous disease of kidney, 591
    neuritis, 343
Tubes, occlusion of, by ligature, 360
Tubo-ovarian cysts, formation of, 106
Tumors, mobility of, 486
Typhoid bacilli in drinking water, 501
    fever, 251
        in children, 599
        diagnosis of, 462
        diet in, 610
        hospital contagion of, 351
        from infected vegetables, 502
        inflammation of costal cartilage as a sequela of, 467
        rare ulceration of œsophagus in, 624
        at Roosevelt Hospital, 354
        treatment of, 103, 483, 599

ULCERS of leg, treatment of, 604
Ulnar nerve, compression of, by callus liberation, 348
        multiple neuro-fibromata of, 526
Umbilical hernia, treatment of, 468
Ungual trichophytosis, treatment of, 243
Urethra, cancer of, 361
Urethritis, posterior, urotropin in, 357
Urethro-prostatic infection, 597
Urine, incontinence of, 235
    partial retention of, 217
Urotropin in posterior urethritis, 357
Uterine arteries, ligation of, for hemorrhage, 234
    fibroids, surgical treatment of, 620
    fibromyoma, pathology of, 487
    hemorrhage, stypticin in, 617
Uterus, adenomyomata of, 281
    and bladder, extirpation of, 236
    cancer of, 360, 487
    complete prolapse of, in the virgin, 485
    inversion of, 360
    lipomyoma of, 488
    myoma of, 364
    prolapse of, operations for, 485
    puerperal, bacteria in, 112
    rupture of, 490
    spontaneous inversion of, 111
    supravaginal amputation of, a disease of adnexa, 618
    tuberculosis of, 733

VAGINAL Cæsarean section, 363
    hysterectomy, recurrence after, for cancer of uterus, 487
Varicose ulcerations, treatment of, by nerve-stretching, 348
    ulcers of leg, new method of treatment, 596
Vegetables, infected, typhoid fever from, 502
Vertebral column, chronic stiffness of, 211
Vesico-uterine fistula, operation for, 236
Vesicular eruption cured by circumcision, 244
Vineberg, H. N., surgical treatment of acute puerperal sepsis, 140

WHOOPING-COUGH, leucocytosis in, 599
    treatment of, without drugs, 722
Wilcox, R. W., senile bronchitis, 520
Williams, H. U., a critical summary of recent literature on plasma-cells and mast-cells, 702
Wood pulp a substitute for flaxseed in poultices, 482
Wounds of heart and pericardium, 218

X-RAYS, localization of bullets by, 349
Xeroform in military surgery, 728

ZINC as a normal constituent of drinking-water, 250

BINDING LIST JAN 15 1931

R
11
A5
n.s.
v.119
cop.2

The American journal of the
medical sciences

Biological
& Medical
Serials

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

STORAGE